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THE CHANGING RELATIONSHIP BETWEEN A UNIVERSITY EDUCATION AND THE LABOR MARKET IN ALBERTA

by

© MARILYN LOUISE WESTBURY

A THESIS

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ABSTRACT

This thesis is designed to provide more objective and precise information about the paths linking a university education to the labor market in Alberta. Several facets of the relationship are explored: the supply trends from the universities in Alberta over time, demand for specific areas of specialization in the labor market as measured by the Canadian Occupational Forecasting Program (COFOR), the balance or imbalance between the aforementioned supply and demand and starting salaries for university graduates in the labor market over time. The thesis focuses on the 1970s and is intended to address the question of whether or not an oversupply of graduates is diminishing demand for the university educated in the labor market. In addition, starting salaries are observed because economic wage competition theory suggests that greater supply reduces demand which, in turn, lowers the salaries that employers are obliged to pay.

The feedback mechanism is also examined in this research. That is, do fluctuations in demand and starting salaries influence the university system directly through enrolment increases, declines and shifts? Finally, the results of the analysis are interpreted within a world systems theory of social change.

The study reveals that demand for all but one major group of professional-managerial occupations actually grew during the latter

half of the 1970s in Alberta. The provincial supply (migrants are excluded) of university graduates was well below the estimated demand for almost all professional-managerial occupational groups. However, when specific occupations are isolated, some fields, such as Chemistry, Physics and Sociology, show a provincial supply surplus. The relationship between enrolments and demand in the labor market suggests that there is some response by students to labor market demand but that other factors appear to mitigate the relationship. In general, student interest in the professional faculties, whose graduates have historically fared well in the labor market, had increased over the latter half of the 1970s. However, total enrolments at Alberta universities were declining at the same time as demand for graduates was increasing in the province.

In terms of starting salaries for graduates, the study reveals that average wages remained above average industrial wages (industrial composite) for the 1970 decade in both Canada and Alberta. Although demand and salaries were higher in Alberta than in all Canada combined, the university graduate starting salary remained at approximately the same ratio to the industrial composite. It appears that the university graduate continued to fare better financially than others in the market place over the past decade. Other factors, as well as demand, influence the wages that employers are obliged to pay. In addition, the highest wage disciplines do not necessarily attract the largest number of students. The data suggest that demand is more important to students than starting salaries. Better a job at a low salary than no job at all.

Finally, the world systems model of social change provides an appropriate vehicle for explaining labor market changes in Alberta. The theory links the labor market to international economic events, such as escalating world oil prices, to account for the buoyant Alberta labor market during the last decade. Global interdependency is very apparent in the twentieth century. World events which created a buoyant labor market in Alberta for university graduates during the past decade have abruptly started to alter and the reverberations quickly ripple through the labor force. The current decade will produce a different labor market for graduates. The theory also suggests that social, political and economic forces shape relationships. University student response to the labor market is mitigated by budgetary constraints, a diminished optimism about the rewards to be gained from a university education and enrolment quotas in many faculties.

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9

INTRODUCTION

Traditionally, there has been surprisingly little information on the transition between higher education and the labor market. During the 1960 expansionist decade for universities, it was assumed that the economy would require increasing numbers of university-educated manpower. By 1971, the Economic Council of Canada[1] warned that too many graduates were finding that their knowledge and skills were not as marketable as they had been led to believe.

The 1970 decade was characterized by changes in the university education and employment interface which coincided with public attitudinal changes. There were many reasons for these changes. The economic climate of Canada altered at the same time as the "baby boom" children matured. This burgeoning population inflated both the demand for educational services and the young labor force. In addition, the social and economic value ascribed to a university education during the expansionist era also contributed to higher student participation in universities. As larger and larger numbers of graduates emerged from these institutions during a decade of comparative economic recession in Canada, the link between a university education and employment was bound to change.

Surprisingly little is known about the state of the university graduate labor market during the 1970s, particularly in Alberta which was somewhat of an economic anomaly in Canada during that decade. The motivation for this thesis was born out of a desire to explore the situation in a more systematic manner. A detailed and objective analysis is beneficial for social, educational and economic purposes. It serves potential students in career selection, teachers and counsellors in their roles as student advisers and administrators, planners and politicians in public policy decision-making. All of these people would benefit from additional data on the outcomes of programs and policies currently in effect.

---

[1] Economic Council of Canada, Eighth Annual Review, 1971, p. 223.

The main purpose of this research is to identify the changes that have occurred in the link between the labor market and a university education in Alberta over the 1970 decade. The focus is on supply and demand and the study is designed to test some common assumptions about the latter. For example, one notion is that there are decreasing economic returns from a university education. Statistics Canada[2] suggests that as the supply of university graduates increased during the 1970s, the competitive position of this highly qualified manpower in the labor market diminished. Greater supply reduces demand which in turn lowers the salaries that employers are obliged to pay. This thesis will test the above assumptions by comparing supply from Alberta universities over time to job opportunities as a measure of demand. In addition, relative starting salaries for university graduates over time are related to the Alberta supply available.

Reciprocal aspects of the university education and employment interface are also explored. That is, do changes in the labor market initiate responsive behavior on the part of potential university students who subsequently make choices on the basis of their perceptions about the labor market? Is there some indication in shifting enrolment patterns that this feedback from the labor market is a source of institutional change?

---

[2] Statistics Canada, Out of School-Into the Labor Force, Cat. No. 81-570E, August, 1978, pp. 183-184.

In addition, a model of institutional change is developed as a framework for explaining the last decade of educational and social change. The model is a vehicle for identifying the structural forces which impinge on the higher education/labor market link. It is primarily drawn from Daniel Chirot's Social Change in the Twentieth Century. The author's adaptation of Chirot's "world systems" model specifically recognizes the degree to which changes in higher education are tied to the historical and economic circumstances of the world, its nations and the regions within nations. The overall orientation is that higher education is a responsive institution. Structural forces promote social change in the higher education/labor market milieu and these changes are part of global rearrangements. The current mood that advanced education has "failed to deliver the goods," has failed to fulfill former expectations may not necessarily be the failure of the higher education system per se. Rather, these shortcomings reflect unrealistic expectations in the light of the larger processes of social and economic change that are affecting all industrial nations. One of the main objectives of this thesis is to ascertain precisely how much, if any, the higher educational system has failed to fulfill its expectations, if by expectations we mean supplying graduates with skills deemed appropriate and worthwhile in the labor market.

Design and Organization of Thesis

Briefly, this study is designed to explore over time the supply of university graduates from representative faculties in Alberta universities to determine if supply has undergone excessive growth beyond the capacity for labor market absorption. Employment opportunities are related to the ongoing supply of graduates from Alberta universities. Supply-demand imbalances, either shortages or surpluses, should indicate the degree to which the labor market is able to absorb university graduates. In addition, starting salaries for graduates are examined over time to determine if a diminished competitive position in the labor market for university graduates is lowering salaries that employers are obliged to pay. The feedback mechanism is also explored. That is, are changes in job opportunities and relative starting salaries consistently related to participation rate changes in universities in Alberta? Do enrolments drop when starting salaries and job opportunities decline? Finally, the interpretation of the data is tied to the world systems model. The attempt is to link changes in the university graduate and employment interface to larger processes of social and economic change.

The organization of the thesis is as follows. The review of the literature in Chapter 1 is followed by a Chapter 2 outline of the world systems model of social change and the specific tenets which the model would suggest for the university education/labor market relationship in Alberta. The main supply factors, including demographic trends, enrolments, participation rates and graduations from Alberta universities are the focus of Chapter 3. The supply information is intended to identify the major trends regarding participation in university education over the 1970 decade and to project these trends into the future. University participation rate changes by discipline choice, age and sex are recorded. In addition, the relationship between participation and demographic factors, such as birth rates and net migration, is observed and compared to the national pattern. A further question about whether or not supply trends fit into a world systems model is explored.

Chapter 4 examines the growth in the labor force, in the number of degree holders in the labor force and the growth in the "managerial-professional, etc." segment of the labor force during the past decade. The main body of this chapter is an outline of occupational demand in Alberta and a comparison of the supply from the universities to that demand. Estimates of demand for major groups of occupations as well as for individual occupations are related to the appropriate output from the universities during the same time period to produce supply-demand imbalances. Also in Chapter 4 is an analysis of starting salaries in various fields in Canada and Alberta over the decade and the relationship of Alberta starting wages in particular disciplines to participation in the appropriate fields of specialization in universities in Alberta. Starting salaries of university graduates are presented as a ratio to average industrial earnings (industrial composite) to determine if the relative financial rewards to graduates in the market place have been deteriorating over time. The feedback mechanism would be measured by the degree to which job opportunities and average starting salaries are related to university enrolment patterns and discipline choices. Findings about supply-demand imbalances and enrolments are analyzed in the world systems framework. The assumption is that the historical, political and economic factors that Chirot identifies as important in social change are also crucial in shaping labor market conditions for highly qualified manpower.

Chapter 5 concludes the thesis with the summary and implications.

CHAPTER 1

REVIEW OF THE LITERATURE

The shortsightedness of educational policy planning appears nowhere more apparent than in the literature on education and employment. In an era when wide use is made of sophisticated statistical methods, gross inaccuracies still plague the experts. It is difficult to comprehend how, in as short a period as five years, educational policy literature appeared to take an abrupt about-face. Somewhere between 1968 and 1972, the conventional wisdom about the benefits that accompany a university education began to be the target of increasing criticism. What has now become a common observation seemed to elude decision makers during the early 1960s. Discounting the advantages of hindsight, it still appears that government and policy leaders were unwilling to heed the early warning indicators of pending problems.

The literature on education and the labor market falls clearly into two distinct periods: that preceding the approximate 1970 date of transformation and the years following. The former was marked by economic optimism about the educational upgrading of the labor force and its presumed benefits for both individuals and society. Recent literature chronicles the current problems of skilled unemployment, oversupply, restricted budgets and the depressed market. It is not that new agencies and critics have taken the earlier planning agencies to task for their lack of foresight in educational and economic planning. Rather those same agencies and authors who were counted among expansionist supporters during the early 1960s have joined the ranks of the disillusioned critics. A good example of the abrupt policy about-face is provided by the Economic Council of Canada. Official rhetoric during the mid-1960s touted the ideology that increasing numbers of highly qualified manpower would be required to supply a booming economy and that education by itself contributes to economic growth. In 1965, the Economic Council of Canada voiced this ideology:

> Very considerable scope would appear to exist in Canada to promote the growth of average per capita income by improving the educational stock of the labor force. The accumulating evidence and analysis (emphasis mine) suggest that the benefits from such improvements can be substantial for both the individuals and the economy as a whole.[1]

The opinions expressed by the same Council in 1971 bore little resemblance to the earlier passage:

> With the growing abundance of highly educated people in our work force, postsecondary education must not be sold to students and the public as an unfailing means to a good job and a comfortable income. Too many people are emerging from the educational system to find that their knowledge and skills are not as marketable as they had been led to expect. . . Education for education's sake will always be a PART of formal education (to the good of our culture), but there are limits on how much of this a society can afford at a given stage in its development.2

Why would a government publication express this polarity of principles in such a short time span? Some writers suggest that politicians used economic jargon to legitimize government activity,

---

[1] Economic Council of Canada, Second Annual Review, 1965, p. 93.

[2] Economic Council of Canada, Eighth Annual Review, 1971, p. 223.

activity that was catering to the needs of the private economic sector. Possibly the explanation lies in the lack of a historical precedent for the surplus in the educated labor force.

THE HISTORICAL DIMENSION

The literature which documents the recent problems of the educated labor force assumes more meaning when the issues are placed in their historical context.

Prior to World War II, higher educational enrolments were comparatively low. This was in line with the lower level of technological development and employer requirements. For the most part, the supply seemed adequate to meet the demand for university graduates. If supply-demand imbalances were a reality during the early decades, evidence suggests that they were minimal and short-lived. Although Canadian college graduates suffered during the depression, their position relative to others improved rather than worsened.[3]

Canada emerged from World War II in a position somewhat similar to the United States. Both countries entered a period of advance in technological development. The need for educated manpower surfaced in many arenas. In academia, staffing difficulties in universities were attributable to expanded opportunities for war veterans to obtain higher education. To fill the academic vacancies, immigration of the highly educated was encouraged.

---

[3] See Richard B. Freeman, The Over-Educated American (New York: Academic Press, Inc., 1976), p. 28, for the effects of the Depression on the American college graduate. Underemployment was a Depression phenomenon paralleling current problems but relative salaries of college trained remained stable during the 1930s and, more importantly, college graduates were less injured by unemployment than were other segments of the labor market.

Demand for skilled manpower also increased in the industrial sector of the economy. Galbraith, in The New Industrial State, ascribes this increase to radically new forces of production coupled with different organizational concepts. These changes prompted experts to feel concern about the lack of highly trained manpower in Canada.

An additional factor which contributed to the growing reliance on universities was that employers began to use higher educational institutions as filtering devices for employee selection. Possession of educational certification was read to mean suitability for certain jobs.

In the wake of these developments, Canada embarked on an enthusiastic policy to increase the supply of highly trained manpower. Higher educational finances and enrolments mushroomed. Demand for faculty spiraled to meet the growing institutional needs.

During this growth period, the literature lauded the trends. "Stay in School" and "Education Pays" became well worn cliches. Agreement on the presumed benefits of education seemed unanimous. Planners, administrators, politicians, academic staff, teachers and the general public supported the policies. Reinforcement for this backing was provided from the system itself. That is, for a given time period the arrangement fed on itself and provided the needed boost to the economy.

During this period, economists began providing an economic rationale for the policies. As previously suggested, one such approach became known as the theory of human capital. The theory grew out of the economic anomalies that succeeded World War 11. National output was growing in an unprecedented fashion while at the same time the nation was beset with periods of high unemployment. Since the unemployment was concentrated among unskilled workers, experts reasoned that upgrading the education of the labor force would reduce unemployment. In the same vein, the growth in real national income was attributed to the improved quality of human resources. Theodore Schultz,[4] Gary Becker,[5] B. F. Kiker,[6] Edward F. Denison,[7] W. G. Bowen[8] and others began to publish the economic rationale for human capital theories. Dennison refined the theories to the extent that he was able to estimate that education alone was the source of one fifth of the economic growth of the United States between 1929 and 1957.[9] Carried one step further, if education per se was a source of economic growth, then the logical course of action was to improve the education of the labor force to generally stimulate the economy.

---

[4] Theodore W. Schultz, The Economic Value of Education (New York: Columbia University Press, 1963).

[5] Gary Becker, Human Capital (New York: Columbia University Press, 1964).

[6] B. F. Kiker, ed., Investment in Human Capital (Columbia, South Carolina: University of South Carolina Press, 1971).

[7] Edward F. Denison, "Education, Economic Growth and Gaps in Information", The Journal of Political Economy (October, 1962, Supplement).

[8] William G. Bowen, Economic Aspects of Education (Princeton: N.J.: Princeton University, 1964).

Human capital theory appeared to receive widespread acceptance. Although few Canadians published independently in the area, government and universities began to incorporate the methodology into policy literature and as a regular feature of statistical publications. It was not that the cultural goals of education were no longer considered important but rather that cultural goals could be realized in a manner which simultaneously provided a boost to the economy and an optimum rate of monetary return to the individual. Canadians were as open to human capital concepts from the United States as they had been to many U.S. cultural norms.

The methodology of human capital emphasizes rates of return to education. That is, education becomes the independent variable responsble for the value of lifetime earnings. By extrapolation, economists proceeded to measure "the economic worth" or the contribution of the educated group to the economy, and use this measure as an index of their productivity. Bruce Wilkinson[10] was among those Canadians active in the economics of education. His work included calculations about the values of lifetime earnings for different Canadian occupations. In general, the Canadian government began to focus more on input-output measures in education, publishing such data as internal rates of return to education.

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[9] Denison, pp. 124-128.

[10] Bruce Wilkinson, Studies in the Economics of Education (Ottawa: The Queen's Printer, 1965).

> The underlying assumption of these measures are (sic) that the costs to individuals in acquiring additional education is a kind of investment. The returns on this investment are the higher earnings made possible by further education.[11]

Along with individual rates of return, efforts were directed at calculating social rates of return to education. One government publication concluded that:

> ...the social rate of return to education at both the high school and the university levels is about double that which we have argued would justify the expenditure.[12]

Having adopted human capital methodology, it seemed a foregone conclusion that investment in higher education would contribute to general economic goals in Canada. Towards the end of the growth period, the federal government began to monitor the size and characteristics of Canada's highly qualified manpower. Table 1.1, compiled by Manpower and Immigration,[13] provides a time series view of higher

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[11] Statistics Canada, Perspective Canada: A Compendium of Social Statistics, 1974, Cat. 11-507, p. 67.

[12] R. A. Holmes, Economic Returns to Education in Canada. Statistics Canada, Cat. #13-556 (occasional) (Ottawa: Information Canada, 1974), p. 28.

[13] A. G. Atkinson, K. J. Barnes and Ellen Richardson, Canada's Highly Qualified Manpower Resources (Ottawa: Department of Manpower and Immigration, Research Branch, 1970).

Table 1.1

GRADUATIONS FROM CANADIAN UNIVERSITIES, PROFESSIONAL IMMIGRATION, AND PROFESSIONAL EMIGRATION TO THE UNITED STATES, 1954-67

Year	Total Graduations (a)	Professional Immigration (b)	Professional Emigration to the U. S. (c)
1954	13,793	8,350	3,352
1955	14,599	7,159	4,166
1956	15,495	9,343	5,277
1957	16,575	16,040	6,251
1958	17,846	7,553	4,784
1959	19,074	6,947	5,593
1960	21,095	7,436	5,587
1961	22,992	6,696	5,285
1962	26,236	8,218	5,833
1963	28,794	9,640	6,344
1964	33,055	11,965	6,171
1965	38,162	16,654	6,453
1966	44,400	23,637	4,926
1967	50,884	30,853	6,386

Source: A. G. Atkinson, K. J. Barnes and Ellen Richardson, Canada's Highly Qualified Manpower Resources (Ottawa: Dept. of Manpower and Immigration, 1970) p. 192.

education graduates, professional immigration and professional emigration to the U.S. The trends in the table point to the possibility of a surplus of highly educated manpower. However, the table is part of a large study which provides only tabular data. No attempt is made to estimate the economic potential of Canada to absorb such a rapidly expanding group of highly trained manpower.

The knowledge industry expansion in Canada was a sequel to a similar occurrence in the United States. Was it intellectual colonialism which prompted the Economic Council of Canada to recommend that Canadians close the education gap with the U.S. as a means of achieving future economic prosperity?[14] Whatever the answer, Canada's efforts in the area were so successful that the nation captured first place among modern industrial societies in the percentage of GNP devoted to education in 1969 (Table 1.2).

Table 1.2

National Comparison of Increase or Decrease in Educational Spending as % of G.N.P., 1955 to 1969.

	Canada	U.S.A.	U.K.	U.S.S.R.	France	Japan	Sweden
1955	3.0	3.3	—	5.8	—	5.0	4.8
1960	4.6	4.0	4.3	5.9	2.4	4.1	5.1
1965	6.3	5.3	5.1	7.3	4.1	4.4	7.0
1969	8.9	6.3	5.8	7.3	4.5	4.0	7.9

Source: Alexander Lockhart, "Future Failure: The Unanticipated Consequences of Educational Planning." In Robert M. Pike and Elia Zureik (ed.) Socialization and Values in Canadian Society, Vol. II. Toronto: McClelland and Stewart Limited, 1975, p. 196.

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[14] Economic Council of Canada, Second Annual Review, 1965, pp. 191-92.

It should be emphasized that during the historical period in question, from World War II to 1969-70, there was a strong market for trained manpower. This market was maintained during the 1950s and 1960s because of several economic realities. First, industrial changes and technological advances had reorganized production and the new forms of organization required highly-educated, technological and managerial specialists. Secondly, both private and government research and development (R & D) spending rose in the 1950s and 1960s, generating more demand for college-trained workers. Third, a booming American economy was spreading to Canada in the form of U.S. owned branch plants. The latter attracted educated Canadians and stimulated a limited amount of R & D which required scientific manpower. Fourth, the extraordinary expansion of the education sector itself provided an upward push to the market. The system, in effect, feeds on itself. All of these factors provided temporary reinforcement for policy planners during the period in question. It appears that the strong market lulled decision-makers into a false sense of security.

Why did the university job market deteriorate so rapidly in the 1970s? Simply stated, all four of the listed forces weakened or actually declined during the 1970s and demand for highly trained manpower dropped.

DIMINISHED EDUCATIONAL OPTIMISM

The abrupt change in the fortunes of university graduates that occurred around 1969 was accompanied by an equally abrupt change in the literature on the subject. In the United States, Ivar Berg in Education and Jobs: The Great Training Robbery[15] was one of the first to seriously question the assumptions on which the economics of education were based. Berg was less interested in the overproduction of university graduates than he was in the general relationship between education and employment. He was critical of the human capital scholars because of their concern with income rather than with worker productivity.

> To prove their case...they would have to study education in relation to the intervening variable of productivity rather than jump over it and deal only with income.[16]

Berg is also skeptical about the increase in educational credentials as prerequisites for employment. His scrutiny of labor statistics suggests that the level of skills needed for modern employment is less than the educational requirements would suggest.

In general, Professor Berg is eager to point out that education is not the panacea that the current generation has been led to believe. At the very least, he is intimating that we take a second look at the empirical evidence which attempts to measure the benefits of a given amount of schooling. If increased education cannot be conclusively demonstrated to improve worker performance, what is the rationale for the current credentialism craze? Berg hints that the methodology inherent in the economics of education is class biased and directed at the maintainance of the status quo.

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[15] Ivar Berg, Education and Jobs: The Great Training Robbery (New York: Praeger Publishers, 1970).

[16] Berg, p. xii.

While Berg raises some controversial questions, he leaves one very important query unanswered. His critique of economic educational arguments seems valid. Methods which try to assess the benefits of education in terms of aggregated income data or cost-benefit analysis are undoubtedly narrow and incomplete. The relationship between wages and productivity seems even more obscure. Yet Berg, like many others, does not deny that such relationships exist:

> ...it would be foolish to deny that education is involved in the nation's capacity to produce goods and services.[17]

How education is related to the economy and productivity of a nation is a critical question which Berg leaves unanswered. Information on the latter would be illuminating in the face of current changing relationships between higher education and the labor market.

On the Canadian front, the Department of Economics at McMaster University was expanding its Working Paper Series in what has become a continued effort to explore the education-labor market links. J. D. Welland replicated an earlier study to determine if schooling and ability were complementary determinants of individual earnings. His enlargement of the human capital methods concluded that:

> ...at a given level of education, the more able earn more, and that the differential payoff to high ability person (sic) increases significantly with the level of education.[18]

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[17] Ibid., p. 189.

[18] J. D. Welland, "Schooling and Ability as Earnings Complements", Working Paper No. 77-16, Dept. of Economics, McMaster University, Hamilton, Ontario, October, 1977.

As graduate unemployment dawned and human capital concepts began to come under increasing criticism, it appears that economists directed more attention to factors, other than schooling, contributing to national income. However, as Welland's study indicates, among high ability people, it is those with the greatest amount of education who benefit most. These studies are important in light of the current market for educated manpower. Welland's 1977 study indicates that schooling remains an important variable (although other components are associated with it) for individual career decisions. This raises another issue, that is, the merit of such studies for guiding individual choices and educational policy. Data for the study were compiled from 1971 statistics. Whether or not the same results would occur using 1979 data is a moot point. The criticism is that studies of market phenomena are usually published years after the data are collected. In a field where short-run fluctuations are common, publications often do not reveal the true nature of the labor market at the time of circulation. Since student choices of fields of study are highly sensitive to shifts in the job market,[19] decisions may be partly based on out-dated and erroneous information.

Within Canada, interest in the linkages between postsecondary education and the labor market has largely been concentrated in Ontario. Before higher education graduates began experiencing employment problems, the Ontario Institute for Studies in Education began a long-term comprehensive study in 1966 of qualified manpower in Ontario. The main objective of the study was to initiate a "manpower approach" to educational planning. The latter is an attempt to measure demand for qualified manpower to assist planners in making policy decisions. By so doing, the hope is to avoid serious supply-demand imbalances in certain labor force groups. At the very least, one should be able to match demand for scientists, for example, to the flow of students in this field through the system at a particular time. "This kind of information may or may not lead to modifications in educational policy,"[20] but it can provide a useful tool in prediction.

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[19] The Carnegie Commission on Higher Education, College Graduates and Jobs (New York: McGraw-Hill Book Company, 1978), p. 185.

The Institute's Report, entitled Qualified Manpower in Ontario, 1961-1986, utilizes the Canadian Census of 1961 as a data base for making projections. Volume 1[21] of the three-volume series provides a very good example of the problems that cloud manpower projection, particularly long-range projection, in Canada. In the first place, it is useful to reiterate that, before the study is initiated, the data base is already five years old. Secondly, the authors explain that much of the census data is not only slow to reach publication but is also unsuitable. Therefore, problems are involved in trying to devise suitable definitions and comparable categories.[22] The specific projection technique used in this study is not the usual manpower forecasting method. Rather, it is intended to be a modest estimate of what the normal course of events can be expected to bring. But modest estimates also must rely on past trends. Thus, they start with assumptions that render the predictions deficient. For example, some assumptions underlying the Ontario report are:

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[20] Cicely Watson and Joseph Butarac, A Summary: Qualified Manpower in Ontario, 1961-1986 Vol. 1, (Toronto: The Ontario Institute for Studies in Education, 1968), p. vii.

[21] Ibid.

> - Labour Force is expected to grow at an annual rate of 2.2%...
> - Employment, it is assumed, will be kept at an average of 97% of the labor force
> - If the basic prerequsites (1 to 5) are fulfilled, the Ontario economy should enjoy a sustained growth of 4.7 - 4.8% per year over our projection period.[23]

What has actually occurred is that basic trends over the past ten years have moved towards a larger percentage annual labor force growth, higher unemployment rates and lower growth rates in the economy. These conditions prevail in Ontario and in most parts of Canada with minor exceptions. Herein lies the major difficulty with manpower forecasting and projecting. They rely heavily on past trends and fail to take into account the possible supply-demand adjustments in the labor market itself. The problems are more acute when dealing with qualified manpower because of the lengthy training period involved. The short-term forecasts which economists have perfected in recent years are of no use when the prevailing labor market conditions ten years hence are required for professionals-in-training. Current problems are prevalent in this highly trained

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[22] Ibid., p. 30.

[23] Ibid., pp. 2-3.

segment of the labor force, suggesting that more efforts at perfecting methods are required.

An additional Ontario source of information on education and the labor market is The Commission on Post-Secondary Education in Ontario. The Commission is directed to study and make recommendations on "the patterns of student preference and demand in post-secondary education, especially as they are influenced by social and economic factors."[24] In its first publication in 1970[25] and in subsequent publications, the Commission examined the linkages between education and the labor market. The main objectives are to explore the many sides of the employment-education issue and to expand empirical data in this area. The underlying feeling of the members is that, although education is often verbalized as a cultural end in itself, educational institutions are more vocationally oriented than student or educators are willing to admit. The popular belief (although current realities are making it less popular) is that a degree represents an investment in training which is marketable in the employment sector. But how marketable are certain degees and how marketable should they be?

The Commission also awarded research contracts for the study of certification.[26] The investigation was twofold: the acceptance of credentials as the principal indicator of ability or competence and the subsequent advantages (or disadvantages to those for whom mobility is blocked because of a lack of necessary certification); and, second, certification and the licensing process among professionals. Among those questions explored were the following: "Should admission to professional schools in various disciplines be limited in accordance with the wishes of the related professional societies?"[27] How effective are the existing forms of certification in communicating a meaningful picture of an individual's achievements and capabilities to potential employers?"[28]

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[24] Edward B. Harvey, Education and Employment of Arts and Science Graduates, a Report submitted to the Commission on Post-Secondary Education in Ontario, August, 1971, Editorial Foreword.

[25] Commission on Post-Secondary Education, Post-Secondary Education in Ontario: A Statement of Issues, 1971.

[26] Applied Research Associates, Certification and Post-Secondary Education, Prepared for the Commission on Post-Secondary Education in Ontario, December, 1971.

The recommendations contained in the Certification Report are somewhat radical and impinge directly on the labor market. In essence, the authors feel that the whole system of degrees and diplomas should be altered in favor of a certification system designed to communicate exactly what skills, knowledge or service a person is capable of offering in the market place. The question of control of the certification system is left up in the air. It appears that the authors are primarily concerned with the trade or job preparation goals of education, since these skills, they argue, can be more easily assessed or measured. The study also endorses the guidance of professional associations, such as the medical association, in monitoring programs for occupationally relevant content.

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[27] Ibid., Editorial Foreword.

[28] Ibid., p. 57.

The proposed concept of making universities trade schools raises some questions about the intended purpose of higher education in general. Are the authors implying that the only benefits to be gained from higher education are the specifically measurable occupational skills? If so, are attitudinal changes unimportant in Canadian society today? There are many who stand opposed to this view. "The assumption that labor market demand is the measure of the value of higher education is a fallacy."[29]

There appears to be a major self-contradiction in Certification and Post-Secondary Education. The study is highly critical of what it calls overspecialization in current higher education. As examples, the authors cite the Ph.D. degree and medical education. Although they concede that specialization by itself is not problematic, they do criticize its use in Ontario universities. However, it is difficult to comprehend how the kind of recommendations the report makes will do anything but exacerbate the problem of overspecialization. They not only advocate vocationally-oriented programs but also direct administrators to allow students to select only those specific courses which are vocationally relevant to their individual purposes and interests. To have every student's program of studies specifically matched to his individual career requirements is an extreme form of overspecialization.

From a broader view, the cultural goals of higher education are ignored in the study. The authors pay lip service to these goals.

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[29] "Dialog," Change, June-July, 1978, p. 66.

> ...both the universities and the professions have a responsibility to the community to ensure that practitioners and researchers alike will receive an education which will permit them to evaluate responsibly the issues of the day.[30]

But the recommendation to trim all non-vocationally relevant courses from a student's program could hardly be classed as a move to provide liberalizing experiences in the higher educational system. Such recommendations signify the end for general arts and science degrees which were never intended to meet job-preparation goals.

In the same year as Certification and Post-Secondary Education was published, Edward B. Harvey was commissioned to prepare a report on Education and Employment of Arts and Science Graduates. The study was designed to throw some light on the problems that B.A. graduates were encountering in the labor market. A sample of over 4,000 B.A. graduates in Ontario was selected from 1960, 1964 and 1968 graduating years. The object was to provide an empirical data base which could reveal trends or patterns of labor market experiences among cohorts from different graduating years. The data do reveal that 1968 graduates were not receiving as high prestige jobs as did their earlier counterparts. Moreover, job satisfaction declined, more students reported being laid off, and more jobs were applied for (fewer offers were made) between 1960 and 1968.[31] The original premise that holders of B.A. degrees were encountering more labor market difficulties in

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[30] Ibid., p. 56.

[31] Harvey, Education and Employment..., pp. 252-257.

1968 than did graduates ten years earlier was supported by the research. Figure 1.1, reprinted from Harvey's report, diagrams the central features of the educational system and the interaction of these with the labor market.

Edward Harvey stands foremost among Canadians publishing in the area of the labor market-higher education interface. In 1974, an expanded version of his report to the Commission on Post-Secondary Education was published.[32] Again, the focus is on the general arts and science degree and its marketability in the seventies. The labor market experiences of other graduates are not included in Harvey's sample. The study explores not only the work experiences of graduates but the value shifts antecedent to or concomitant with labor market changes.

Harvey proposes that the new goals of education are less vocationally oriented than in the past.

> Trends in university curricula, the findings of Ivar Berg, and Trow's strongly-argued case for general education suggest in our view that, as far as the university is concerned, the vocational component of the educational facility it has to offer is declining in importance.[33]

This new direction in education is towards the preparation of people more receptive towards change and with "a greater degree of flexibility when faced with on-going technological change."[34] However, if adaptability and flexibility are important attributes for graduates, it would appear that this opinion is not shared by em-

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[32] Edward Harvey, Educational Systems and the Labor Market (Don Mills, Ontario: Longman Canada Limited, 1974).

[33] Ibid., p. 57.

[34] Ibid., p. 56

Figure 1.1

Overall Field of Social/Economic Forces

Post-Secondary Education

1) Growth and Change
    - increased supply
    - substitution factors (e.g., emergence of CAAT's graduates)
2) Changing Patterns of Access
3) Changing Content
    - vocationalism/generalism

Linkage at Level of Systems

Labour Market

1) General Change in Structure and Composition
2) Educational Upgrading
3) Changing Patterns of Demand
4) Employer Practices and Preferences

Individual Inputs

1) Sex
2) Time of Entry to Labour Market
3) Type of Training
4) Academic Performance
5) Background Characteristics

Source: Edward B. Harvey, Education and Employment of Arts and Science Graduates. A report submitted to the Commission on Post-Secondary Education in Ontario. August, 1971. p. 38.

ployers. As Harvey concludes from his study, it is precisely those graduates from the general, flexible, non-vocationally oriented programs who are experiencing the most difficulties in the labor market, i.e. arts and science graduates.

While Harvey was investigating the labor market experiences of arts and science graduates, Marjaleena Repo was exploring the similar ordeals of Ph.D. graduates from the University of Toronto. The object of the study, a project of the Graduate Students' Union at the University, was to record the problems of 190 Ph.D. job-seekers from the 1969-70 graduating class. The results indicated that by June of 1970, 44.7% of the Ph.D. graduates had not found jobs.[35] Repo's response was indignant. "One cannot help but get the impression that there is a conspiracy of silence amongst the agencies involved."[36] The university faculty seemed unwilling to acknowledge a problem, a situation which left students without the necessary information to realistically evaluate their future prospects. The university was not the only agency to come under criticism. Repo's summations implied that the whole problem was a result of government bungling. Among those items cited as causing the difficulties were: the high immigration of foreign professionals in fields where there is abundant Canadian manpower, a two year tax-free period for foreign teachers, a lack of foresight on the part of the federal government for not requiring foreign-owned industries in Canada to conduct a proportionate amount of research and development within Canada and a lack of accurate information on employment opportunities and problems for graduates.

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[35] Marjaleena Repo, I'm a Ph.D. Who Needs a Ph.D? (Toronto: Graduate Students' Union, University of Toronto, 1970), p. 36.

[36] Ibid., p. 2.

The predicted consequences of "government bungling" have not reached the crises proportions forecast by Repo. The Ph.D. output in Canada, which was approximately 1,300 in 1969-70, was projected to reach 5,700 by 1980-81.[37] In fact, Ph.D. output plateaued around the 1,800 figure during the 1970 decade.[38] Repo, like many other prophets, used past trends as a guide for projection. What she failed to take into account was the responsive behaviour of students towards a depressed market.

An additional Canadian touting the government mismanagement notion of graduate unemployment in 1971 was Alexander Lockhart. In "Graduate Unemployment and the Myth of Human Capital," Lockhart provides an economic rationale for the current problems. He points out that narrow, human capital assumptions came to dominate public policy. Lockhart feels that the agencies involved were unwilling to heed early warning indicators. The author explored the unique functioning of the Canadian economy and its labor market in such a lucid manner that the reader is left wondering how the current problems could have arisen.

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[37] Ibid., p. 5

[38] Statistics Canada, Advance Statistics of Education, 1977-78. Cat. No. 81-200 (Ottawa: August, 1977), p. 45.

In other publications, Lockhart concentrates on the social implications of graduate unemployment. He recommends that more stress be placed on the cultural benefits of education as a means of countering the anticipated drop in the prestige attached to education. Therefore, creative planning will be necessary to preserve knowledge "as a productive and hence regenerative force in society."[39] The author anticipates that radicalism and anti-social behavior will be one response to the "marginal man" position of many graduates today. To prepare for a profession or occupation and then to be denied entry into it "is to have one's own legitimacy within the social order denied."[40]

No Canadian has explored the links between higher education and the labor market as extensively as American Richard Freeman has in the United States. The author's work is primarily centred on the economic theory of labor supply to explain the market for high-level manpower after World War 11. Although there are obvious differences between the two countries, enough similarities exist to render some of Freeman's conclusions equally valid when applied to Canada. Neither country has a "planned economy." That is, consumer choice in Canada and the United States is a major determinant in the production of goods and services. Moreover, the higher educational expansion during the 1960s was at least a partial response by both governments to meet social demands for educational services. For this reason, Freeman's conclusion "that the market for college-trained specialists is governed by economic forces in a relatively direct way"[41] is consistent with Canadian interpretations of domestic problems. In opposition to laissez-faire advocates, Freeman does not feel that measuring the responsive mechanism of the labor market eliminates the need for policy. On the contrary, the observed responsiveness of the market can be useful in indicating to government what methods of intervention are likely to be successful and what incentives are most desirable in terms of the specified social goals.

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[39] Alexander Lockhart, "Educational Policy Development in Canada: A Critique of the Past and a Case for the Future" in R. A. Carlton, L.A. Colley and N. J. MacKinnon (ed.), Education, Change, and Society (Toronto: Gage Educational Publishing Company, 1977), p. 84.

[40] Alexander Lockhart, "Future Failure: The Unanticipated Consequences of Educational Planning," in Robert M. Pike and Elia Zureik (ed.) Socialization and Values in Canadian Societies, Vol. 11 (Toronto: McClelland and Stewart, Ltd., 1975), p. 200.

Freeman's economic model showing two of the main mechanisms for allocating university manpower is contained in Figure 1.2. It is suggested that the supply-demand imbalances in the university labor market have been similarly operative in Canada during the past fifteen years. The focus of Freeman's study is on the leading indicators of market change which, when carefully monitored, become sensitive predictors for guiding educational policy.

Freeman's work is preeminent in the field. It provides one of the most comprehensive approaches to the subject. He not only supplies a picture of the operation of a university labor market but

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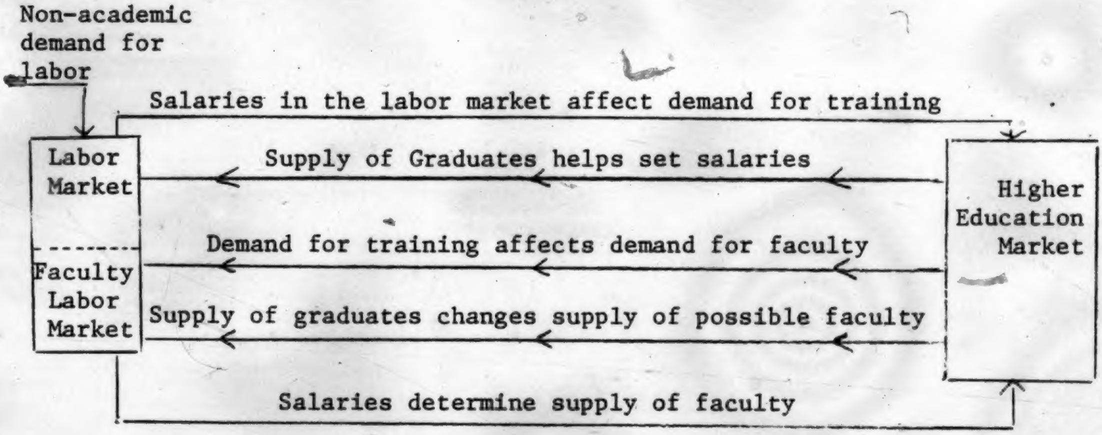
[41] Richard B. Freeman, The Market for College-Trained Manpower (Cambridge, Massachusetts: Harvard University Press, 1971), p. 227.

Figure 1.2

Linkages Between Education and Labor Markets


Non-academic demand for labor
Salaries in the labor market affect demand for training
Labor Market
Supply of Graduates helps set salaries
Higher Education Market
Demand for training affects demand for faculty
Faculty Labor Market
Supply of graduates changes supply of possible faculty
Salaries determine supply of faculty

Source: Richard B. Freeman, The Market for College-trained Manpower. (Cambridge, Mass.: Harvard University Press, 1971), p. 28.

illustrates how that market impinges on various disciplines in very different ways. For example, while high supply and low demand have been the bane of arts and science graduates, other university majors are competing in a far more favorable market. Freeman carefully outlines how economic forces and specific social changes can influence the market for graduating students in varying ways. The pragmatic nature of the author's work is also one of its major strengths. Unlike human capital theorists, he makes no attempt to tie educated labor to the economy through such gross measures as national output, GNP, or national productivity. Rather, he concentrates on supply and demand features and those measurable indicators which signal a changing market for university graduates. However, Freeman concedes that even this somewhat restricted approach is not without problems. Economists, like most social scientists, cannot control for all extraneous variables in relationships.

> Experiments...have shown that failure to foresee sharp shifts in exogenous variables has led to sizeable divergencies between simulated and actual patterns even though the basic model provides a good "fix" on behavioral and market realities.[42]

RESPONSES TO UNIVERSITY EDUCATION/ LABOR MARKET CONCERNS

In the past few years more scientific interest in Canada has been fixed on the highly educated labor market. Attempts have been made to isolate the important mechanisms or variables impinging on this labor market. In addition, more effort has been directed at predicting future trends to aid in effective policy planning in education. While policy planners and educators seemed to have been caught unprepared for graduate employment problems a decade ago, they now appear to be more realistically addressing the issue in spite of the fact that problems continue to elude easy solutions.

At the national level, the federal government released two occasional publications on the education-labor market topic. The first, Out of School - Into the Labor Force,[43] provides data and analyzes trends and prospects for school enrolment, school output and the labor force in Canada through 1986. Although Statistics Canada has kept tabular data on education and the labour market as a regular feature this was the first attempt to show that many trends in both areas are interdependent. The report also goes beyond many Statistics Canada publications in discussing implications of the projections.

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[42] Freeman, The Over-Educated American, p. 212.

[43] Z. Zsigmond, G. Picot, W. Clark and M. S. Devereaux, Out of School - Into the Labor Force (Ottawa: Statistics Canada, Education, Science and Culture Division, August, 1978).

Among the limitations of the study listed by the authors are:

> In many instances, it would have been desirable to compare the supply of manpower from various levels of the education system with the demand for such workers to assess their labor market prospects. But, the manpower demand projections for such a comparison were not available.[44]

The authors made no attempt to relate supply and demand using the Department of Employment and Immigration's COFOR (Canadian Occupational Forecasting Program) model. However, at the time Out of School...was published, the COFOR projections covered only the period 1976 to 1982 while the authors were dealing with school output to 1986. This probably explains why they did not attempt to compare supply with demand.

An additional limitation of the study was the fact that the authors did not estimate the numbers of students anticipated from specific postsecondary disciplines. Rather, they limited the scope to total output from postsecondary institutions. The focus was on the total impact on the labor force of a volume of workers emerging from various educational levels.

Clark, Devereaux and Zsigmond followed with The Class of 2001[45] in February, 1979. Based on 1976 Census data, the document supplements and clarifies earlier publications by Statistics Canada on demographic changes and the impact on the educational system. Added to this document are provincial as well as national fluctuations in school-age population based on patterns of fertility and migration. Basically, the main purpose of the publication is to highlight the more apparent effects that population waves might have on the school system. The relevant age groups for each level of education are shown. Although postsecondary education is non-compulsory, demographic trends are nonetheless important indicators of future enrolment trends. "Approximately 80% of full-time post-secondary students are within the 18-24 or 17-23 age groups."[46]

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[44] Ibid., p. 27.

[45] W. Clark, M. S. Devereaux, Z. Zsigmond, The Class of 2001: The School-age population - Trends and implications - 1961-2001 (Ottawa: Statistics Canada, Education, Science and Culture Division, February, 1979).

The Class of 2001 is valuable because it isolates Alberta from the former "Prairie" category. One is thus able to compare and contrast Alberta with other provinces and Canada as a whole. In addition, a very complete look at how demography may affect the "supply" of students as well as potential labor market entrants is presented.

Governments are not the only parties interested in the higher education/labor market interface. The Technical Service Council, a non-profit placement service and personnel consulting firm financed by industry, has been active in the field since 1927. Bryce, Haultain Personnel Consultants is a Division of the Technical Service Council. With offices in seven major Canadian cities, the TSC is Canada's largest placement service for professionals and highly qualified manpower. It has acted as consultant to the Ontario government as well as to several universities. In addition to offering suggestions for proposed courses for universities, it operates a university recruiting service. The Council also conducts ongoing statistical studies on the job market and manpower forecasts. Regular publications include "Quarterly Report on the Job Market for Professionals" and "Review of Professional Manpower" (annual) both prepared by General Manager and Director of the TSC, Neil A. Macdougall. Two additional TSC publications prepared by Edward B. Harvey and K.S.R. Murthy are: "Supply of and Demand for Accounting Professionals in Canada" and "Supply of and Demand for Engineers in Canada."[47] In its efforts to link supply of and demand for professionals, the TSC is foremost on the Canadian scene which is why over 1600 firms and institutions use the Council. Whereas most Statistics Canada publications have tended to concentrate on the supply of highly qualified manpower, the Technical Service Council is more interested in labor market demand or job opportunities for professionals. It was initially founded by educators and industrialists to combat the large "brain-drain" of science and engineering graduates to the United States in 1927.

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[46] Ibid., p. 15.

K.S.R. Murthy, who is under contract to the TSC along with Edward Harvey, is a Trent University economist who developed the popular CANDIDE (Canadian Disaggregated Inter-Departmental Econometric) model. It is a macro-economic model to describe inter-relationships among economic and labor market variables. The model is used in the preparation of demand projections for the Technical Service Council. The method used to project labor market demand is based on a large econometric model which specifies the links between general economic growth patterns, prospects for particular industries and occupational profiles of these industries. The CANDIDE model is also used by the Canada Department of Employment and Immigration in developing COFOR[48] projections. The COFOR methodology involves forecasting industrial output and employment levels and subsequently dividing employment into requirements for specific occupational groups.

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[47] All publications of the Technical Service Council are available at cost (comparatively high!) from Suite 901, One St. Clair Ave., E., Toronto, Ontario, M4T 2V7.

> COFOR links output and employment growth for 69 industrial sectors to a general medium-term forecast of the Canadian economy. Occupational profiles of the industries, as measured in the 1971 Census and in the 1975 Occupational Employment Survey, are then used to convert projected industry employment levels into estimates of requirements for some 496 occupational groups. In addition to requirements based on industry employment trends, COFOR also estimates probable deaths and withdrawals from the labor force for each occupational group.[49]

Projections thus include net job creation from industrial growth and jobs vacated due to death or retirement.

A large econometric model like CANDIDE only specifies the links between general economic growth patterns and prospects for particular industries at the Canadian level. However, the Regional Economic Services staff, often in conjunction with the provincial governments, provide additional information about provincial trends. In this manner, the macroeconomic scenarios are "provincialized." Thus, after the CANDIDE simulation, there is a reconciliation of provincial and Canada scenarios. COFOR projections for Alberta have followed the two national publications (1976 and 1981).

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[48] Labor Market Supply & Demand Analysis Division, Department of Employment and Immigration, Occupational Requirements to 1985: Canadian Occupational Forecasting Program (COFOR), Ottawa, January, 1981.

[49] Ibid., p. 5.

A systematic classification of occupations is used in the COFOR projections. The Canadian Classification and Dictionary of Occupations (CCDO) is an extensive manual prepared by the Department of Manpower (now Employment) and Immigration during the 1970s. Classifications are on the basis of work performed and are described in the manual.

The model thus enables one to isolate projections for specific occupations such as sociologists or chemists. For this reason, it can assist planners by indicating occupational requirements in specific fields of training over a time period.

Generally speaking, most short to medium-term forecasting models have proven reasonably accurate, particularly when compared to long-term forecasts. However, significant changes in the labor market and the economic environment in Canada since the first COFOR was published in 1975-76 (covering the period to 1982) necessitated generating a new set of estimates. The latter reflects more closely the demographic and energy-related developments anticipated for the 1980s.

Many new models are being pressed into service on the Canadian scene. Some are used to specify demand for specific occupations, such as teachers. These developments appear to be more concrete attempts at educational and economic planning. The prospect of a surplus of highly qualified manpower did not surface in educational and planning literature a decade ago. The reverse prospect of a shortage of highly qualified manpower in the near future is equally sparce in the education literature today. It is interesting that some planners, at least, are attempting to develop more accurate, predictive methodologies to guide more organized and logical institutional planning.

Teacher supply and demand has become a recent area of study because of declining enrolments. The most elaborate model used to date in Canada is the FLEXOR (Flexible Operations Review).[50] The latter not only projects supply of teacher graduates to 2001 and the number of teacher admissions to training facilities needed each year but it also can calculate total costs and per student costs.

In addition, The Ontario Ministry of Education has under contract Cicely Watson and Saeed Quazi[51] of O.I.S.E. to produce annual projections of pupil enrolment and teacher supply. In the past year, the authors have disaggregated secondary teachers by subject specialization.

British Columbia and Alberta are now generating their own forecasts of teacher supply and demand. Projecting K-12 Teacher Supply and Demand in Alberta was produced by Dr. G. Loken of the University of Calgary under contract to Alberta Education. The study is due for public release in the near future. The author employs what he calls teacher demand predictor models, a simplified ratio approach which he hopes will encourage regular use. Unlike the Ontario results, the data are not broken down by subject specialization and level. However, the authors are recommending that Alberta Education forms be amended to include such information as to permit future breakdown by subject specialization. The overall conclusion of the study is, "Even if teacher imports are included in the supply and demand projections, Alberta will still have an increasing shortage of teachers in this decade."[52]

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[50] R.W.B. Jackson, Final Report, Toronto: The Commission on Declining School Enrolments in Ontario, 1978.

[51] Cicely Watson, Saeed Quazi and Raemish C. Kumar. Projections of Enrolment and Teacher Supply. Toronto: O.I.S.E., 1977, 1978, 1979.

Improvements to the predictive ability of these many models have attracted considerable study. Attempts have been made to amend procedures by including variables often excluded from regression analysis. For example, interactive and feedback effects should be included in any projection. When teacher shortage interacts with a general labor shortage, will the teacher shortage be greater than anticipated? Has the feedback news regarding the difficulty of obtaining teaching jobs over the past few years deterred prospective teachers from enroling in education? Boundary variables, such as the opportunity costs of selecting a particular profession, often influence models. While it may be difficult to quantify the exact influence of these variables, it is nonetheless important to mention them or preferably to estimate their influence.

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[52] Dr. G. Loken, Principal Investigator, Projecting K-12 Teacher Supply and Demand in Alberta under contract to Alberta Education. Completed Aug., 1980. Unpublished document, p. 86.

Most of the demand or manpower projection study in Canada has been primarily government sponsored. Although universities are experiencing changes in enrolment patterns, little interest in labor market demand is expressed by administrators. This avoidance of market demand is intentional and arises from some philosophical notions about the purpose of a university. Most frequently expressed are the concerns that the universities are becoming trade schools:

> ...there is concern and fear that over-emphasis on this market demand might cause the university to move away from its responsibility as a centre of academic study in the community.[53]

Moreover, it is generally agreed that the major objective in general degree programs is cultural development rather than economic growth. The training and refining of intellectual abilities and the development of character, tastes and attitudes all come under the umbrella of cultural development. Figure 1.3 presents policy objectives for education as outlined by the Economic Council of Canada.

The Senate also expresses that there should be a "reasonable balance between the humanities, social sciences and the natural sciences on the one hand and the professional faculties on the other."[54]

Not only do most university administrators feel that they cannot respond to short-term changes in market demand but they also do not believe that such a practice is desirable.

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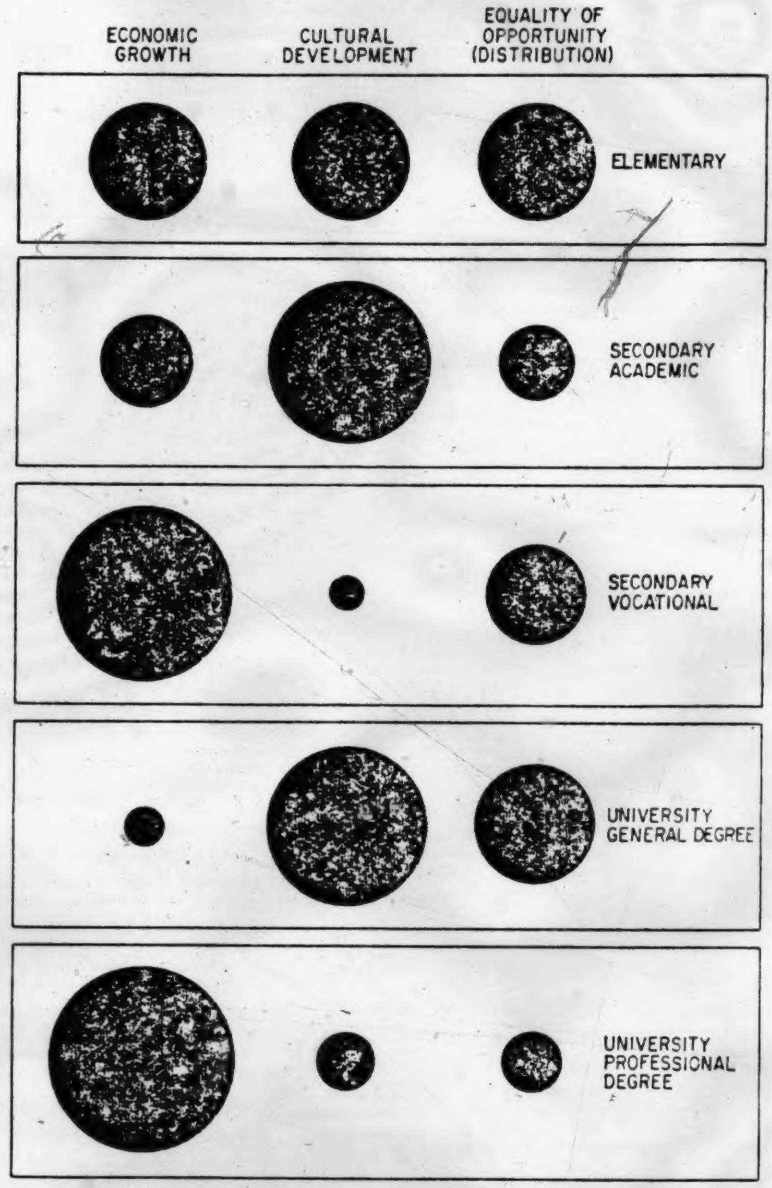
[53] The Senate, U. of Alberta, Edmonton. The Problem of Quotas. A Report prepared by the U. of Alberta Senate Task Force on University Entrance Requirements on The Limitations on Enrolment at the U. of Alberta, Sept., 1974, pp. 9-10.

[54] Ibid.

Figure 1.3

AN IMPRESSIONISTIC VIEW OF
RECENT POLICY OBJECTIVES FOR EDUCATION


ECONOMIC GROWTH
CULTURAL DEVELOPMENT
EQUALITY OF OPPORTUNITY (DISTRIBUTION)
ELEMENTARY
SECONDARY ACADEMIC
SECONDARY VOCATIONAL
UNIVERSITY GENERAL DEGREE
UNIVERSITY PROFESSIONAL DEGREE

Note: The areas of the three circles at each level of education add to the same total size. No comparisons among levels of education should be made.

Source: Economic Council of Canada, Eighth Annual Review, Sept., 1971, p. 200.

While it would be difficult to discredit these ideals and goals, at the practical level they raise problems. Recent occurrences suggest that the cultural goals are also intermingled with the social and economic goals of education. Students appear to be responding to diminished economic returns and diminished job opportunities and long-run effects on the nation's cultural development are likely to follow. While administrators may be fearful of emphasizing market demand, students appear to be vitally interested in market demand. For this reason, continuing study in the economics of education can ultimately serve to safeguard those cherished benefits which have come to be associated with higher education in Canada.

CHAPTER II

THE WORLD SYSTEMS MODEL

Introduction

Most sociological models have tended to focus on the analysis of social change at a national level. The world systems model is a more recent theoretical tool which concentrates on relative position in a global economic network. Class and cultural conflict can thus be defined from an intersocietal as well as from an intrasocietal perspective. The model acknowledges that decisions made in one country, or even between groups of smaller nations can have a far-reaching impact. Similarly, certain class positions are identifiable across national boundaries. Finally, certain problems such as inflation, lower productivity levels, changing attitudes towards work, rising energy costs, changed government spending priorities and increased unemployment are common in many modern, western nations. For all of these reasons, it appears that the world systems approach can provide a useful framework to identify global processes and their national impacts.

The world systems model is here employed because it is suggested that factors affecting the relationship between a university education and the labor market are best understood as smaller manifestations of these global processes. All internal social change is not necessarily linked with larger changes in the world system but a large part of it is. Much of what is occurring in the Albertan labor market, for example, can be causally connected with changes in the world system.

To date, the world system approach has had limited application and the model is still in need of refinement. However, the model recommends itself as a novel and realistic assessment of change particularly in the twentieth century. The remainder of this chapter will consist of a general history and explanation of the major tenets of world systems analysis. For the specific purposes of this thesis, Daniel Chirot's[1] version will be the prime focus of interest. The position of Canada and Alberta in the world system is identified and the relevance of the model to the university education/labor market relationship in Canada and Alberta concludes the chapter.

World Systems Analysis

Immanuel Wallerstein[2] is generally credited with originating the basic idea of "core-periphery" or "world systems" analysis. Wallerstein, although he is critical of the many versions of Marxism, feels that one of the virtues of that Western intellectual's work was the historical dimension. The emergence of the modern world economy is traced by Wallerstein to sixteenth-century Europe and the predominance of market trade. In the nineteenth and twentieth centuries there has been only one global system, the capitalist world economy, according to the author.[3] The defining characteristic of this world system is that it is a social system which has a single division of labor. The world economy and capitalism go hand in hand. That is, neither is the cause of the other and they are both part of the same phenomenon. The international division of labor rests on a system of interdependent economic exchange which guarantees that the continuous needs of an area will be met.

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[1] Daniel Chirot, Social Change in The Twentieth Century. New York: Harcourt Brace Jovanovich, Inc., 1977.

[2] Immanuel Wallerstein, The Modern World-System: Capitalist Agriculture and the Origins of The European World Economy in the Sixteenth Century (New York: Academic Press, 1974).

Wallerstein advances that a system of economic exchange can clearly exist without a common political structure. The world system is also characterized by multiple cultural systems within the international division of labor. Capitalism, from its beginnings, was not a phenomenon of nation-states but a world-economy affair. Sixteenth century agricultural capitalism preceeded the current era of industrial capitalism. By 1640, three structural positions had become stabilized in the world economy - core, periphery and semi-periphery. Wallerstein sees the role of the semi-periphery as vital to the system. It becomes the mediator between the upper core stratum and the lower periphery stratum - between the exploiter and the exploited.

At different stages different groups play the leading role in the world system. British hegemony gave way to United States hegemony after World War II. But Wallerstein sees this leadership role as secondary to the relative political stability of the world system which guarantees its survival. Three factors have been instrumental in the system's survival. First, military strength is concentrated in the dominant [illegible]mp. Second, there is an ideological commitment to the whole system. This is not a Weberian "legitimation" of the system but rather that members come to identify their own well-being as wrapped up in the system. Finally, the presence of the semi-periphery is politically indispensable to the system since it prevents polarization.

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[3] Immanuel Wallerstein, The Capitalist World Economy (Cambridge: Cambridge University Press, 1979), p. 5.

Class boundaries for Wallerstein are determined by a collective relationship to the world economy. Class and ethnic groups transcend national boundaries. Confusion often surrounds class analysis because it is generally limited to nation-states or "ethno-nations." Ethnic consciousness in a peripheral area is not comparable to ethnic consciousness in a core area because these two ethnic groups have a different class position vis-a-vis the world economy.

Although there is considerable political manoeuvering in the capitalist world economy, Wallerstein feels that true imperialism (à la Lenin) is not possible. The dreams of world-empire led to the demise of "Pax Britannica." Economic pressures on the United States have also caused a decline in its hegemony. The cost of political imperialism is frequently economically too high. A prime example is the American withdrawal from Vietnam due to internal pressure.

Where, then, do those countries fit who do not allow private ownership of the means of production? Are the U.S.S.R. and China part of a capitalist world economy? The fact that nationalization of industries transpires does not mean that these industries do not conform to the capitalist market system. Wallerstein feels that increased efficiency to maximize prices on sales and the desire to capture a larger surplus of the world economy are both goals of the U.S.S.R. Because they have nationalized industries and reallocated the internal consumption does not imply that the U.S.S.R. does not operate in a capitalist world economy.

> If tomorrow U.S. Steel became a worker's collective in which all employees without exception received an identical share of the profits and all stockholders are expropriated without compensation, would U.S. Steel thereby cease to be a capitalist enterprise operating in a capitalist world economy?[4]

Although Wallerstein concedes that such a move would undermine the ideological justification of world capitalism, he argues that the increase in communist states on the world scene has actually had a stronger stabilizing than destabilizing effect on the world system. These new semi-peripheral areas are the fundamental survival element of the system because they reestablish the three tiers which depolarize the world economy.

The current stage four in the world capitalist economy is a consolidation stage. The decline in U.S. hegemony has increased the freedom of capitalist enterprises, many of which are now multinational corporations. The latter are better able to outmanoeuvre state politicians within national boundaries because they are not under the control of any one political unit. Moreover, the growing strength of the core and semi-periphery while the gap between these two and the periphery widens is further evidence of a consolidation in the world capitalist economy.

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[4] Ibid., p. 34.

Eventually, Wallerstein does predict the demise of the capitalist system. This will occur because the system suffers from two fundamental contradictions.

> 1)... Whereas in the short run the maximization of profit requires maximizing the withdrawal of surplus from immediate consumption of the majority, in the long run the continued production of surplus requires a mass demand which can only be created by redistributing the surplus withdrawn. Since these two considerations move in opposite directions (a 'contradiction'), the system has constant crises which in the long run both weaken it and make the game for those with privilege less worth playing.
> 2)... Whenever the tenants of privilege seek to coopt an oppositional movement by including them in a minor share of the privilege, they may no doubt eliminate opponents in the short run; but they also up the ante for the next oppositional movement created in the next crisis of the world-economy. Thus the cost of 'cooption' rises ever higher and the advantages of cooption seem ever less worthwhile.[5] (numbers added)

Daniel Chirot,[6] another author who has adopted the world systems model, is less precise in his predictions. Chirot retains the triad of core, semi-periphery and periphery and concentrates on the changes in the capitalist world system during the twentieth century. Although Chirot makes some amendments to Wallerstein's thesis, he holds to the basic strengths apparent in the latter's work. His approach has a strong historical dimension. He emphasizes the importance of economic change as the force behind social and cultural change. The economic changes that have occurred in the twentieth century have brought about particular changes in the internal stratification of societies. With the latter comes a basic shift in the balance of power. Although economic changes are the main focus for Chirot, he recognizes that there are other important determinants of social change as well.

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[5] Ibid., p. 35.

[6] Daniel Chirot, Social Change in the Twentieth Century (New York: Harcourt, Brace Jovanovich, Inc., 1977).

Chirot, while acknowledging an international division of labor, identifies a pattern of stratification within each type of society. The dominant, core societies are more industrialized, urbanized and richer than the others. During the twentieth century they have experienced a growth in the middle class due to income (not wealth) redistribution. These core citizens are better educated and they tend to give widespread acceptance to the political and social structures. In the periphery, there are more ethnic and racial divisions among the less educated, less urbanized and less industrialized masses.

Like Wallerstein, Chirot perceives a large growth in the semi-periphery during the twentieth century. Countries like Japan have gained core status. Unlike Wallerstein, however, Chirot sees the two major Communist powers, the Soviet Union and China, as the assailants of a united capitalist core. "In effect, international relations now consist of a jockeying between the core, the Soviet Union, and China for power and influence in that growing semi-periphery which, however, remains free to play off the major powers against each other."[7] However, Chirot denies the existence of a united, international communist system to challenge a united capitalist core. COMECON, the communist version of a European Common Market, has been a comparative failure. China and the U.S.S.R. are trading partners with the capitalist world although they cannot be called integrated parts of the capitalist world system. Chirot demonstrates some ambiguity here. He appears to be claiming that the Soviet Union and China are trading partners in the world capitalist system (which both Wallerstein and Chirot argue makes them part of that system) but they are not INTEGRATED parts of the system by Chirot's verdict. He bases his judgment on the fact that the Soviet Union and China are ideologically hostile to the capitalist world with which they may deal but whose demise they anticipate. Moreover, Chirot's opinion is that these latter countries are adequately self-sufficient to become autonomous systems of their own.

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[7] Ibid., p. 181.

Chirot carefully examines the behavior of core capitalist countries to answer the Leninist charge of imperialism and expansionism. He concludes that core behavior appears to concur with Lenin's thesis with three provisos. The wars that Lenin predicted between capitalist core powers for control of the world system are past. In their place have come tighter social, economic and political integration of the capitalist united core. Second, the Lenin assumption that the capitalist countries would expand because of a shortage of resources is not borne out. There is no proof of short resources among "expansionist" capitalist countries. Finally, core capitalist trade and investment did not only go to peripheral countries as Lenin's theory suggests but there was also a large intra-core and core-semi-peripheral trade and investment pattern.

These shifting, external relations between nations are followed by changing class relations within nations. Chirot predicts that the United States and its core allies will remain powerful for some time but that the 1970s have been a definite blow to U.S. hegemony.

On introducing Chirot's world system approach, it was mentioned that he was less precise than Wallerstein in his predictions. Although he alludes to the contradictions in the system, he leaves the prophecies to the reader. On the one hand, Chirot posits that the Leninist theory is a good analytical tool for accounting for many international events in this century and, at the very least, that the benefits of the latter far outstrip the "liberal" theory of a decade ago. However, he is never certain if the theory is correct or not and, accepting that it is partially correct, he rejects the possibility of a radical left revolution. Rather, if the United States begins to suffer greatly because it is losing control of the periphery, Chirot feels that a shift to the right and fascism may be a more predictable move. The latter appears more likely because of entrenched government bureaucracies, capitalist upper classes and the fear of social change in the relatively comfortable masses that will intensify nationalism. In addition, Chirot's major contention is that loss of peripheral control need not necessarily cause economic collapse and/or revolution in the core as the Lenin theory predicts.

With this brief introduction to world systems theory by two of its major advocates, a more specific clarification and definition of concepts is in order. The following definitions and terms are primarily adapted from Chirot whose model will be the main one used in the remainder of this chapter.[8]

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[8] Ibid., pp. 11-15.

Concepts and Definitions

WORLD SYSTEM: The identifying feature of the world system is the notion of a set of interconnected societies. This interdependence is a totally relative concept. That is, relative positions in the system, whether weak, middling or strong, determine the state of each society. No society is totally independent. For example, the cores must depend on the control of foreign resources from the semi-periphery and periphery. Relative positions are defined by Chirot as follows:

> CORE SOCIETIES: economically diversified (in the twentieth century that means industrialized), rich, powerful societies that are RELATIVELY independent of outside control.
>
> PERIPHERAL SOCIETIES: economically overspecialized, RELATIVELY poor and weak societies that are subject to manipulation or direct control by the core powers.
>
> SEMI-PERIPHERAL SOCIETIES: societies midway between the core and periphery that are trying to industrialize and diversify their economies. While they are weaker than core societies, they are trying to overcome this weakness and are not as subject to outside manipulation as peripheral societies.[9]

Chirot identifies two types of conflict groups in the world system.

CLASS: A group of individuals who have a common position within an economic system or are united by a common economic interest. Class can be analyzed on the intrasocietal level as well as on the intersocietal level. When members of the group cooperate to back their economic interests, they are acting on a class basis. Members of a class do not always cooperate or act in their own economic interests, i.e. the rich do not always unite against the poor. Any economic system has at least two classes with divergent interests. Chirot considers class conflict to be the major basis of conflict in this century although his world system model acknowledges a role for cultural conflict.

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[9] Ibid., p. 13.

CULTURALLY BASED CONFLICT GROUPS: Groups or individuals united by a non-economic, mutual interest such as ethnicity, religion, language or political ideology. Frequently, cultural conflicts are based on economic inequalities and are thus doubly intense but there are also times when class and culture act against each other. If the people of Quebec unite because they are French rather than rich or poor, they form a culturally based conflict group. Nationalism has been a common basis for cultural union during the twentieth century.

> Generally, in the twentieth-century world, the divisions within the world system have been based primarily on the economic division of labor (class) as well as on cultural and ideological considerations, chiefly nationalism. The existence of these two types of cleavage, which may be contradictory, has made events rather unpredictable. This also applies to internal conflict within particular societies, and therefore, to the process of social change in general.[10]

Canada in the World System

What is Canada's status in the world system? The position here defended is that Canada is a semi-peripheral nation. This stance is at variance with Chirot who claims that Canada has moved from being a European peripheral society to a core nation. However, employing Chirot's economic and cultural criteria for distinguishing core, periphery and semi-periphery, Canada is not a core nation. Chirot defines cores as economically diversified and industrialized and relatively independent of outside control - in terms of both foreign investment and cultural domination. Canada lags sufficiently behind the United States and other core powers in these areas to merit the term semi-periphery.

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[10] Ibid., p. 14.

Consider the degree of industrialization and economic diversification in Canada. Chirot sees the former as that proportion of the world trade in manufactured goods that a country provides. In comparison to core nations, Canada ranks low by this measure. Industrialization received an added push in Canada because tariff laws encouraged U.S. investment in the production of goods in Canada. However, the historic Canadian pattern has been the export of raw materials (staples) for processing in core nations and a heavy import of manufactured goods. Both the variety of Canadian manufactured goods and the proportion of the latter that we trade are still relatively limited.

In addition, Canada has historically been dominated by outside control in the form of foreign investment. As a colony in 1913, seventy percent of foreign investment in Canada came from Great Britain.[11] Gradually, United States investment in Canada superceeded British foreign investment. The sheer dollar value of foreign ownership suggests that Canada does not qualify as a core country "relatively independent of outside control."

Finally, Canada does not emerge as culturally independent of outside control. Chirot explains that core societies cause other societies to change if not by force then by example.[12] That is, economic domination brings cultural and intellectual domination. As Leo Panitch[13] observes, all of our major institutions are permeated by U.S. values and our life-styles are highly influenced by American media.

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[11] Lorna Marsden and Edward Harvey, Fragile Federation: Social Change in Canada (Toronto: McGraw-Hill Ryerson, Ltd., 1979), p. 42.

Although prosperous and industrialized, Canada is economically and culturally dependent. It is neither core nor periphery. Canadian sociologists have frequently focused on this dependency relationship between Canada and the U.S. Bi-polar models, such as the metropolis-hinterland thesis developed by A. K. Davis, have been the main theoretical tool. More recently, however, Wallace Clement has suggested that the idea of "go-between nations" is an appropriate framework for describing countries like Canada. "Canada has a rather unique role as mediator of foreign controlled capital, as holder of its own foreign investments and as host to extensive foreign investments."[14] Although Clement claims that Wallerstein's divisions (and by extension, Chirot's) lack the necessary refinements for placing Canada within the world system,[15] he shares the view of Canada as both exploiter and exploited.

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[12] Chirot, p. 40.

[13] Leo Panitch, The Canadian State: Political Economy and Political Power (Toronto: University of Toronto Press, 1977), pp.3-27.

[14] Wallace Clement, Continental Corporate Power (Toronto: McClelland and Stewart Limited, 1977), p. 24.

[15] Ibid., p. 23.

Future refinements to the model may clarify Canada's position. Disagreements in interpreting Canada's place should not be perceived as discrediting the world systems as an appropriate analytical tool. Current events suggest the necessity of a more universal analytical approach than has formerly been the case. The most dramatic example of global interdependency has been the 1973 OPEC cartel among a group of formerly peripheral nations. The full ramifications of the energy crisis may be filtered through the United States to Canada but the root cause lies outside the hegemonic control of this powerful U.S. core. Herein lies the strength of Chirot's thesis which posits that "independence of any society is totally relative in this century."[16]

"Position in the world system is an important aspect of domestic change."[17] How, then, has Canada's role as an affluent, semi-peripheral nation determined the course of her history? It is suggested that Canada's inherited economic structures and her geographical proximity and economic dependence on the dominant core power in this century have been major factors in the development of the country. Moreover, capital in world systems analysis is also seen as a social relationship. The Canadian pattern of economic development has determined certain class interests and has been instrumental in establishing factors of region, language and ethnicity which have sometimes overridden class interests in the history of Canada. The assertion here is that Canada developed as it has because of its inevitable ties to the capitalist world market system. In addition, our institutions, including our higher educational system, have been moulded by these ties. What remains is to further explore the position of Canada and Alberta in world systems analysis. Finally, the framework will be applied to institutional change as it affects the system of higher education in Canada and Alberta.

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[16] Chirot, p. 13.

[17] Ibid., p. 212.

Canada - Expansion and Contraction in the World System

In tracing the history of the world capitalist system, both Wallerstein and Chirot point out that there are long cycles of expansion and contraction. Wallerstein suggests that expansion occurs when world effective demand is greater than total world production and contraction occurs when production exceeds demand.[18]

> These are cycles of 75-100 years in length in my view and the downward cycle is only resolved by a political reallocation of world income that effectively expands world demand. I believe we have just ended an expansionary cycle and we are in the beginning of a contractual one.[19]

Chirot concurs with this view and dates the beginning of the contractual cycle as the early 1970s. These cycles historically have been concerned with attracting capital for industrial development. This process of capital formation has led to extensive foreign (particularly U.S.) ownership of Canadian industry. Chirot claims that this open strategy worked very well for Canada because she was resource-rich and had a highly skilled population.[20] In fact, there are both positive and negative consequences to an open strategy. On the positive side, the investment climate in Canada was good enough to encourage core investment in various enterprises. The standard of living, wage levels and per capita GNP rose as a result. On the negative side, extensive foreign ownership perpetuates economic dependency. Also, as Marsden and Harvey[21] point out, we no longer have any choice of an open or closed strategy. Our long period of industrialization leaves little in the nature of an agrarian or alternative life style to fall back on. More than half of the labor force is employed in the manufacturing and service sector. The government is compelled to maintain an industrial economy. Industrial production creates jobs and generates wealth for imports and creates export products and markets. The expansion of the capitalist world economy in the twentieth century cemented Canada's position as an open member of the system dependent on the main core power.

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[18] Immanuel Wallerstein, Ed., World Inequality: Origins and Perspectives on the World System (Montreal: Black Rose Books, 1975), p. 24.

[19] Ibid.

[20] Chirot, p. 214.

A relatively small number of multinational corporations came to increasingly dominate the world capitalist system by the 1960s. It is Chirot's contention that although they undoubtedly have a great deal of power, these multinationals DO NOT control nation-states in the core (including Canada by Chirot's definition). Nevertheless, Chirot cites these multinationals as the main instrument of core domination in the world system. During the expansion period in the American world capitalist system, the core gained from the economic power that was concentrated in the hands of a few large businesses in five ways. Canada, as an affluent, semi-peripheral nation, shared some of these five benefits outlined by Chirot.[22]

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[21] Marsden and Harvey, p. 219.

First, "the core gained access to a large quantity of raw materials, particularly oil."[23] This access kept prices lower, not because the peripheral nations received a lower than world price for their oil but because the greater the available quantity of a resource, the lower its price will be. Canada, as an importer of oil and one of the largest per capita consumers of petroleum energy in the world, benefited from this same preferential bargaining position by virtue of its open policy to the resource multinationals.

Second, the core gained cheap labor from other nations. Canada also gained cheap labor from the Caribbean and other peripheral regions. While these menial laborers are a small part of the total Canadian labor force, they nonetheless become an important safety valve by reducing class tensions. They free a segment of a more industrialized nation from the most unpleasant, worst paid tasks.

Third, the core gained places where enormous profits could be made through investment capital. Although Canada was a source of profits (it provided 12 percent of the total world profits of American private investors[24]) for the United States, the reverse is also true. Canada, not merely a dominated hinterland, sits firmly among advantaged nations.

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[22] Chirot, pp. 176-177.

[23] Ibid., p. 197.

[24] Chirot, p. 153. These are U.S. government figures and are likely to be understated.

In 1974, Canada held 20 percent of all foreign direct investment in the United States (5.3 billion).[25] Clement identifies indigenous Canadian foreign investment as separate from what he calls go-between (semi-peripheral) investment. The former reflects autonomous power in Canada and the latter is an indication of Canada's dependency on U.S. capital. In the manufacturing industry, 56.8% of Canadian Direct Investment abroad in 1970 was of the dependency or go-between type.[26] However, certain indigenous Canadian foreign investments particularly in banks, life insurance, utilities and transportation are well established internationally. Canadian multinationals, such as the holding companies Power Corporation and Argus, are numbered among world giants. Brascan, George Weston Limited, Cominco, Canron, Consolidated Bathurst, Distillers Corporation-Seagrams, Royal Trust, Hollinger Mines and Steel Company of Canada are but a few of the indigenous companies with extensive multinational operations.[27] Canada is a heavy investor in Latin America, including the Caribbean. For example, Canadian insurance companies control 70 percent of the business of the entire Caribbean.[28] Brascan, in 1974, sent half of its $108 million profit from Brazilian business back to Canada.[29]

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[25] Wallace Clement, Continental..., Clement quotes Globe and Mail, 4 May 1976: B7.

[26] Canada, Statistics Canada, Canada's International Investment Position, 1968 to 1970, Information Canada, 1975, p. 29.

[27] See Wallace Clement, Continental..., pp. 113-131 for a more complete picture of Canada's foreign investments.

[28] Ibid., p. 121.

In sum, although the U.S. controlled "go-between" foreign, direct investment dominates manufacturing and resources, the Canadian controlled finance and transportation/utilities component of Canadian, foreign, direct investment is considerable. While Canadian income from foreign investment would be substantially less than that in the U.S., many indigenous Canadian capitalists have reaped profits and privileges. In the western hemisphere, Canada paradoxically displays both dependence and dominance.

Chirot's fourth point is that through the multinationals the core gained a market for some of its exports. These exports are of the high technology variety since the core maintains a virtual monopoly on science and research. Canada has benefited, however, as an American protege in science and research. Production of food-grains in both Canada and the U.S. is a high technology industry. Canada has also entered the resource field with inventions and improvements in oil recovery techniques, heavy equipment and the petrochemical industry. For example, Alberta's specialty in world markets is its highly advanced oil and gas technology. For the year ending August, 1979, $7.3 million of Alberta products (mainly of the latter type) were sold at international trade exhibitions and promises and contracts exceeded $158 million.[30]

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[29] Ibid.

[30] Edmonton Journal, 3 January, 1981: B1.

Fifth, the core has gained skilled professional labor from the non-core. Chirot claims that this one-way movement of researchers and scientists is a key element in the perpetuation of inequalities between nation-states. Canada, however, has experienced more of a reciprocal movement of skilled manpower. As Table 1.1 indicates, many more professional immigrants entered Canada in the 1954-1967 period than professional emigrants to the U.S. from Canada.

These five "benefits" derived by core nations through multinationals have also proven to be benefits, albeit more moderate, for Canada. They do help to indicate why Chirot placed Canada among modern core powers. The description of strong, semi-peripheral nations given by Chirot is also compatible with Canada's position. The author stresses that an open strategy determines the direction of internal development. Canada emerges as dependent in some fields and dominant in others. Capitalists in Canada have different kinds of relationships with U.S. capitalists: frequently reciprocal, often subordinate but sometimes autonomous.

Chirot claims that the world (but not domestic) power of the multinationals is dependent on the political/military umbrella that the United States is able to sustain particularly among peripheral nations. Canada has never been strong enough internationally to provide such state support. Very often, Canadian multinationals depend on the sphere of influence created by the U.S. in a region. Nonetheless, Canada has developed state agencies offering services to businesses such as the Trade Commissioner Service and the Export Development Corporation. These services are often duplicated in the provinces - Alberta has an International Trade Minister. These kinds of services, however, are not reinforced by political and military control abroad.

Chirot sees the American world system as entering a contraction period since the early 1970s. The form of neocolonialism of core over peripheral nations is increasingly subject to revolutionary struggle, often directed against economic investments. The giant corporations are politically weak and have used the political/military state apparatus to create and control the climate of investment in peripheral nations. This climate of investment is becoming more frigid. Chirot advances other reasons for the contraction. The Vietnam war was too costly and fostered middle class political discontent in the U.S., thus forcing a withdrawal. This loss of face appeared to be followed by a political attenuation in which the U.S. could no longer intervene in the affairs of other nations with the impunity it once enjoyed. Chirot speculates that the OPEC power coup was a direct result of this U.S. loss of prestige. Certainly, the single most dramatic impact on the U.S. and the multinationals was the 1973 OPEC agreement which broke the core's access to a large quantity of a valuable resource at a low price.

Chirot sees the U.S. at a crossroads. "The overwhelming proportion of citizens in core societies will refuse to pay the military and aid costs needed to keep peripheral societies open and nonrevolutionary."[31]

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[31] Chirot, p. 178.

He predicts that business itself will withdraw as costs grow and benefits shrink. Wallerstein would claim that the contractions in the system have made "the game for those with privilege less worth playing."[32] Chirot suggests that both nationalism and political independence have become driving forces in the periphery.

Where Chirot differs from the Leninist view is in the fact that he feels that the major accomplishment of the world capitalist system has been the political, social, cultural and economic integration of the major powers. Wallerstein also agrees that the current contraction phase is a time of consolidation in the world capitalist system. Canada remains part of this totally integrated system which is expected to "remain rich and powerful for a long time to come."[33]

Class and Politics

Earlier it was stated that capital is seen as a social relationship in world systems analysis. We now turn to world systems class analysis and its application to Canada. Chirot defines class as a 'common position in an economic system' or a 'common economic interest.' He posits that most economic systems have generally more than two classes who do not always act on a class basis. Class conflict is nonetheless seen as the major basis of conflict in the twentieth century. In accordance with Wallerstein's thesis, class conflict is an intersocietal as well as an intrasocietal phenomenon. The uniting of oil-exporting states into OPEC is an example of intersocietal class action. Clement documents a strong continental capitalist class relationship in specific economic sectors between Canada and the U.S. The latter is a prime example of how major powers are now consolidating through international capitalist class action.

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[32] Wallerstein, The Capitalist World Economy, p. 35.

[33] Chirot, p. 181.

Conversely, with the exception of the communist bloc, Chirot does not see any universal movement of peasants or workers (non-capitalists) to compare with a unified international capitalist class. He does, however, acknowledge that the most radical revolutions in peripheral nations are those in which the mass of peasants are organized and control of state machinery is total and rapid. China and Mexico are cited as examples of class based revolutions. However, most peripheral nations are united by a new nationalism, which Chirot defines as a cultural rather than a class phenomenon.

Chirot is not an advocate of a power-elite theory of American society. In terms of core powers, his intrasocietal analysis does not reveal a single, all-powerful economic/political/social elite. While he recognizes that economic and political powers are related, he presents three major reasons why changes in core societies during the twentieth century have limited the political power of the capitalist upper class.[34] Chirot affirms that these three changes that have occurred in the U.S. are analogous to changes in other advanced, industrial societies, including Canada.

First, the middle class has grown to include an expanding propor-

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[34] Chirot, pp. 191-193.

tion of the population. While it is not possible to speak of a 'united' middle class in Canada, certain segments of this group have provided labor and money for political movements that have opposed the power of the corporate elite. In political democracies like Canada, this large group does hold veto power over unpopular government decisions. At the very least, such actions as the consumer movement in Canada do provide a limited rein on capitalist dominance.

Second, Chirot sees a better organized and more powerful working class as a check on capitalist political control. Union movements and strike activity in Canada have increased since World War II and are effective in reducing total elite power. There is a paradox here, however. While unions reduce the total power of a capitalist elite, they simultaneously stabilize the capitalist system. This is primarily because benefits derived through unions tend to appease the working class while, at the same time, they do not pose a serious threat to the survival of the capitalist system.

The third and most important limitation on elite power cited by Chirot has been the growth of government bureaucracies.

> A bureaucracy, merely by existing, develops interests directly related to the survival and prosperity of its members and independent of the original purpose for which the bureaucracy might have been created.[35]

A new bureaucratic "class" has emerged which appears to form a group devoted to its own political and economic interests. This class always serves itself but there are times when it also serves corporate interests. The thesis posits that these two needs are not always identical.

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[35] Chirot, p. 195.

The concept of bureaucratization is not new in social science. It has been a much debated topic. Is there any evidence to suggest "bureaucratic class" action in Canada? Are there situations where a bureaucratic class seems to be serving its own interests which do not happen to be synonymous with corporate interests? There are many who would suggest that the 1980 federal government budget is in conflict with all segments of the capitalist elite in Canada - indigenous and go-between. The immediate impact of the budget (along with provincial response to it) appears to have been negative and costly for the capitalist class. By Chirot's thesis, current policy of the federal government may be cited as bureaucratic class action, that is, serving its own interests first. Moreover, the federal-provincial conflict may be viewed as conflict between a regional and a national bureaucratic class whereby the interests of the two parties are paramount to the interests of any capitalist class in Canada. The creation of Petro-Canada and the increase in government resource control may also be interpreted as bureaucratic class action.

These events seem to support Chirot's point that power elite theory is not applicable in Canada today. This statement raises some interesting analytical questions about class and politics in Canada. In particular, how do current events fit the power elite theory of Canadian society documented by Wallace Clement in The Canadian Corporate Elite? This book stands as the last, most complete, and thoroughly referenced class investigation in Canada. Clement replicated John Porter's 1951 and 1961 studies[36] in an effort to update the latter to 1972. The author reasoned that Porter's conclusion that there were "plural" and separated elites in Canada was inappropriate in light of the fact that "the degree of interpenetration between state and corporate elites has more than doubled over the past two decades..."[37] Instead, Clement argued that the growth of state involvement in economic activities was intricately tied to the needs of private capital.

> State expenditures have been directed toward stabilizing relationships within the population and as a means of funneling surplus to dominant economic interests. In other words, what has frequently been understood as encroachments by public power on private power turns out in practice to reinforce and strengthen private interests.[38]

Almost a decade has elapsed since Clement's investigation was undertaken. Within that period important political and economic events suggest that a need exists for further replication of Clement's work. The practice of recruitment of previous state elite into dominant corporate positions outlined by Clement may possibly be in decline. Because a practice has been documented in the past is no reason to assume it will continue in the future. Some of the major federal policy makers of 1980 seem too far removed from corporate interests for recruitment. For example, Dr. W. Edmund Clark, Assistant Deputy

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[36] John Porter, The Vertical Mosaic (Toronto: University of Toronto Press, 1965).

[37] Wallace Clement, The Canadian Corporate Elite (Toronto: McClelland and Stewart, Ltd., 1975), Preface, p. xxiv.

[38] Ibid., p. 364.

Minister of Energy, Mines and Resources who is generally viewed as the central author of the energy budget, appears to the oil industry to exhibit a strong, anti-capitalist bias. Many oilmen have copies of parts of his thesis, "Socialist Development and Public Investment in Tanzania, 1964-73."[39] In addition, other strategists involved in the National Energy Program are considered "mandarins...somewhat out of touch" and lacking "experience in the industry."[40] While it may well be that corporate recruitment from this very important ministerial portfolio may continue, ongoing study in the field is suggested.

Using Chirot's thesis, the current situation in Canada could be interpreted as a repudiation of power-elite analysis. The link between state and corporate power is currently not as obvious as that demonstrated by Clement in 1972. Petro-Canada and National energy policy appear not, at least in the short run, to have been a "means of funneling surplus to dominant economic interests."[41] Chirot's contention that there "is no single power elite but rather a set of partially overlapping, and sometimes mutually hostile forces"[42] at work seems to be a feasible interpretation of current politics and class in Canada. It may well be that Liberal government policy in

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[39] Alberta Report, 26 December, 1980, pp. 11-12.

[40] Ibid., p. 12

[41] Clement, The Canadian Corporate Elite, p. 364.

[42] Chirot, p. 199.

1981 is an indication that Chirot's "bureaucratic class" is developing interests directly related to the survival, prosperity or power of its members independent of both its original mandate and the Canadian corporate elite.

In summary, Chirot feels that there have been internal changes in class relations within advanced industrial nations during the twentieth century. In particular, he feels that competing forces have reduced the power of a small corporate elite. Chirot suggests that other modern industrial societies including Canada have had similar internal class changes. A large middle class has gained a greater share of the income (but not the wealth), a better standard of living, more education, the luxuries of an industrial economy and, as the expansion in the American world economy ceases, the price of coopting the masses grows increasingly expensive. While sharing these middle class advantages with the middle class in the U.S., Canada is faced with two major differences: lower productivity and higher per capita government expenditure in many areas such as health and welfare.

Finally, Chirot contends that the full impact of government growth and the new bureaucratic class have had consequences for the world system. While Chirot shares with Marx a definition of class based on an "economic division of labor," he differs from Marx in his explanation of modern class relationships. Moreover, he accepts the possibility of culturally based stratification.

Culturally Based Stratification

Although Chirot feels that culturally based hostility is frequently correlated with specific economic positions, he adopts the contingency of cultural conflict that is not intensified by economic inequality. For example, the racially-based union of poor southern whites with white landowners against blacks is 'pure' cultural conflict since the poor whites do not appear to be acting in their own economic or class interest.

The most accurate interpretation of Chirot, however, suggests that he is more concerned with ethnic, regional, religious and linguistic differences insofar as they are shaped, conditioned or intensified by underlying class differences. In other words, class conflict is ubiquitous but can be obscured by the more immediate or obvious pursuit of cultural goals. At both levels of analysis, global or national, the author contends that the most persistent political conflict will occur when class and cultural differences are combined. Position in the world system is determined by relative economic autonomy such that certain national cultures also occupy specific economic positions in the system.

Domestic politics and social stratification also correlate with position in the world system. The level of development of a society does not necessarily end ethnic, regional or religious conflict or hostility.

> Development does not end regionally based hostilities if it perpetuates regional inequalities in power and wealth.
>
> . . .
>
> Development does not eliminate religious conflict if religious differences remain correlated with major ethnic, regional, or class differences.
>
> . . .

> It is not correct to say that development ends ethnic divisions, not as long as there exists a culturally based division of labor in which certain culturally defined groups continue to occupy only certain economic positions.[43]

Chirot appears to stress the overlapping nature of cultural and class factors even within core nations. He correctly points out that while ethnic, linguistic, regional and religious tensions remain high in the periphery and semi-periphery, they have in the recent past increased in the core where "economic stratification" coincides (often partially) with cultural stratification.

Marsden and Harvey, who claim to adopt the world systems model of Chirot, see class interests in Canada as fractured by ethnic, linguistic and regional loyalties.[44] It is true that these forces, most notably in Quebec, have interfered with the development of a national culture or identity but the extent to which they "fracture" class interests is a moot point. Quebec provides a classic case where a different language clusters with a separate culture, religion and region. Many would claim that these combined factors have fractured class interests. On the other hand, it is frequently voiced that the separate language, culture, region and religion of Quebecers has been used as a basis for exclusion from economic power in Canada. Since any group operating in their own economic interest constitutes a class, it could be argued that the conflict has both a class and a cultural base. In which case, all three of Chirot's aforementioned principles

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[43] Chirot, pp. 56-57.

[44] Marsden and Harvey, p. 222.

(footnote 43) would apply.

Canada differs from core powers in the extent to which the majority of the population is intergrated into a national culture and shares an allegiance to the state. Chirot claims that in spite of minor cultural divisions, every core society (excluding Ireland) has a highly integrated national culture when compared to non-core societies. Canada's history of French and English dominance seemed to mitigate the development of a national identity. Linguistic differences and constitutional rights were partially responsible. However, as French and English dominance was replaced by American it has frequently been charged that U.S. cultural influence via the media has been the main block in the development of a national culture and identity in Canada.

Alberta, Regional Nationalism and Nationalism

The fact that certain regions in Canada were historically richer and more powerful than others has produced regionally based ideologies which Chirot calls regional nationalisms. "In a sense, every core society was like a mini-world capitalist system, that is, composed of a dominant industrial-financial core and dependent, generally overspecialized peripheries."[45] Chirot considered the core societies of the early twentieth century to be mini-world systems. He claims that there followed a more even development within most core powers.

Historically, Canada has followed a mini-world system pattern. Central Canada became the early, dominant industrial-financial core and the east and west parts of the dominion were generally over-specialized peripheries. Where Canada differs from the major powers is that relatively uneven development persists today. This fact provides one further justification for the semi-peripheral rather than core title for Canada. In addition, Canada has been unable to nurture an integrated national identity or culture.

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[45] Chirot, p. 57.

The struggle to integrate Canada continues. During the expansion period in the world capitalist system, core power was solidly entrenched in central Canada. National policies were designed to direct international trade in a manner which precluded regional economic development. The Atlantic region, a pre-Confederation manufacturing centre with an active trade along the Atlantic seaboard, became a relatively poor and dependent region after Confederation. Nor has national policy had the most favourable impact on the Prairie provinces.[46] In addition, Quebec has expressed its unique grievances within confederation. Among them is the charge of an anglophone power clique in southern, urban Quebec while the townships and predominantly francophone community suffer relative, economic deprivation. Thus, the general historical pattern in Canada has been that the less developed regions provide labor, raw materials and markets for a developed, central core. Manufactured goods from a relatively small region in central Canada enter the international trade market while primary products are supplied by the other regions.

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[46] For a more complete analysis of uneven regional economic development in Canada see: T. W. Acheson, "The Maritimes and 'Empire Canada'" in David J. Bercuson (ed.) Canada and the Burden of Unity (Toronto: Macmillan, 1977); Vernon C. Fowke, The National Policy and the Wheat Economy (Toronto: U. of Toronto Press, 1957); Gilles Paquet, "Some Views on the Patterns of Canadian Economic Development" in T. N. Brewis (ed.) Growth and the Canadian Economy (Toronto: McClelland and Stewart, 1968).

During the recent contraction phase in Canada's mini-world capitalist system, Alberta's relative position has grown to be that of a strong semi-periphery. The increase in the world price for oil has been directly responsible for this growth. Conversely, the price increase has been one of the main factors exacerbating the economic contraction at the national level. Current events in Canada including federal-provincial conflict, constitutional debates, national energy policy and regional nationalism in Alberta are here discussed in the context of several of Chirot's tenets.

1. Development does not end regionally based hostilities if it perpetuates regional inequalities in power and wealth.[47]

2. It remains true that in the semi-periphery substantial portions of the population do not accept the definition of nationalism provided by their states. It is, however, increasingly difficult for core interests to take advantage of this, as they did earlier, because most contemporary states are so much stronger than old peripheral states used to be.[48]

3. Nationalism, the ideological force that propelled the Western core to world supremacy, has now spread to the rest of the world and eroded if not yet totally ended that supremacy.[49]

4. The drive towards internal consolidation and balanced economic growth has become almost universal.[50]

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[47] Chirot, p. 57.

[48] Ibid., p. 186.

[49] Ibid., p. 181.

[50] Ibid.

> 5. [G]overnment... has, by and large, limited the extent of corporate power. Most of this limitation has been achieved through regulations imposed by government and through the financial power of the government and its ability to control money supply...[51] [numbers added].

To outline, it is suggested that current problems in Canada are the result of changes in the world system which have brought about an economic contraction. The latter includes reduced markets as well as a decline in U.S. supremacy. Economic problems in Canada and elsewhere are frequently spin-offs from rising energy prices. Regional hostility and federal-provincial conflict in Canada are a result of inequalities in power and wealth and non-agreement over what constitutes 'nationalism'. A drive towards balanced economic growth and internal consolidation by the federal government of Canada appears to undermine current federal policy. Federal government regulation, control and, to a lesser extent, monetary policy have limited total corporate power in Canada suggesting that massive, economic, U.S. core investment and control through multinationals may not survive in the future.

Alberta has historically harbored hostility towards central Canada. Expressed sentiment is often revealed as resentment against a rich and powerful central Canadian manufacturing and banking corporate elite which is backed by federal government support. Power and wealth, then, have been historically regionalized and have perpetuated hostility as stated in the first tenet drawn from Chirot.

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[51] Ibid., p. 195.

During the past ten years, however, some wealth (if not power) has shifted as Alberta gained a very strong semi-peripheral position in the Canadian mini-world system. When oil prices quadrupled in 1973-74, Alberta's economic position in the Canadian economy altered significantly. Simultaneously, the sudden increase caused serious macro-economic problems federally because Canada is an importer of oil. Importing contries like Canada could not immediately reduce their oil purchases or consumption and hence had to decrease their purchases of domestic goods and services to pay a continually increasing energy bill. At the same time, the increases showed up in consumer price indexes throughout the world, exacerbating fears that the already bothersome inflation was getting worse. Large outflows of money to pay oil imports and decreases in domestic demand have a depressing effect on the economy. The results are higher rates of domestic unemployment coexisting with high inflation as well as rising debts and payment imbalances in international markets.

These developments spelled unprecedented wealth from resources for the province of Alberta along with a greater share of the economic power in Canada. Herein lies the current conflict situation. The provincial governments gained control over their own resources in 1930, a concession from the federal government and a bonus for the slower-developing, debt-ridden western provinces. Under current circumstances, however, the federal government is faced with mounting debts from rising energy costs and insufficient funds from domestic taxation to meet the costs. Federal energy policy set in October, 1980 is designed (among other things) to redirect some of the resource taxes back to Ottawa. Intertwined in the dispute is the unwillingness to pay producing provinces world prices for their oil resources. The state government claims that this is necessary in order to prevent Canadian energy prices from rising to world levels while costs of imported oil are tied to these higher world levels. Some claim that allowing domestic energy prices to float would impose undue hardship by transferring high prices to those least able to pay them. The political skeptics charge that a sudden, large increase in energy costs to the average Canadian consumer would be political suicide to the government in power. The latter interpretation is consistent with Chirot's thesis that a state bureaucracy serves its own interests first. It is also true, however, that price increases tend to fuel inflation through the consumer price index.

Whatever the reason for controlling domestic prices, the result is the same. Real costs are higher, demand grows, oil imports rise and OPEC is the target of criticism although Canada is helping to increase demand which pushes world oil prices upward.

> The most urgent need the world has is to make it more difficult, if not impossible, for the oil exporting countries to inflict further shocks. That requires either producing more of one's own energy needs, or curtailing the consumption of energy.[52]

The fact that Alberta is the major oil producing province in Canada, and that the province does not support the federal 'definition of nationalism' has intensified 'regional nationalism' in Alberta. The province defends its right, gained by constitutional changes in 1930, to control its own resources. Federal infringements on resource taxation along with a refusal to pay world prices for oil purchased from Alberta have intensified federal-provincial hostility. In addition, a unilateral move by the federal government to patriate the Canadian constitution without provincial agreement has further fueled the fire. "It remains true that in the semi-periphery substantial portions of the population do not accept the definition of nationalism provided by their states."[53] The federal government's position is that Alberta, in particular, should be willing to share more of its resource windfall with the remainder of Canada. What the federal government defines as 'Canadianization' the Alberta government describes as 'federalization' or even 'socialization'.

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[52] Dian Cohen, "Economy", in Canadian Consumer, October, 1980, p. 47.

All of these events are consonant with tenets one, two, three and four derived from Chirot's model. Nationalism appears to have become a driving force in Canada and not all of the population accepts the federal definition of nationalism. There appears to be a drive toward internal consolidation particularly in the case of constitutional patriation. Energy issues are paramount because they provide the field on which the games are played.

The expressed rationale behind the National Energy Program also seems to confirm the "drive towards internal consolidation and balanced economic growth."

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[53] Chirot, p. 186.

> The government believes that a larger national public sector presence in oil and gas is the only equitable way to meet quickly our goal of increased Canadian ownership.[54]

Chirot also predicts a decrease in the global, massive, multinational economic control and investment by U.S. corporations. The current "limitations...through regulations imposed by government "[Tenet number 5 quoted from Chirot] would seem to confirm that more government control is imminent.

> The rapid growth that is inevitable for the energy sector in Canada over the next decade or two would strengthen further the position of these foreign oil companies, giving them even greater power in the Canadian economy than they have today. Foreign control over the total Canadian economy would be increased and the management of the pace and priority of Canadian energy projects would be left largely in the hands of the foreign major oil companies.[55]

The federal government appears to be attempting to strengthen its own position vis-a-vis the provinces but also to strengthen its position in the world system. Chirot sees most nations as now moving in this latter direction through the avenues already cited.

Some final comments should be made in respect to Chirot's contention that government has limited corporate power through regulations imposed as well as through the ability to control money supply. Government monitarism has not proven to be a highly effective economic weapon in recent years. Nor has monetary policy in Canada necessarily addressed most economic problems. For example, the recent recession (1980-81), like the last recession (1974-75), was precipitated by the OPEC oil increase. Both have been inflationary recessions. Recently, however, Canada shares both the inflation and recession of other countries who have already absorbed higher OPEC oil prices. The difference is that part of Canada's oil supply is purchased, mainly from Alberta, at less than half the world price. Why Canada shares the current recession and slow economic growth can be partly explained by interrelationships in the world system.

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[54] Edmonton Journal, 22 January, 1981: AID. Quotes from the National Energy Program.

[55] Ibid. National Energy Program as quoted by the Edmonton Journal.

> The Kiel Institute for World Economics forecasts that the output of OECD countries will drop by four percent during this [1981] recession; output drops because of reduced demand, which results from the diversion of money from a variety of goods and services to energy. If there is reduced demand within any nation for the nation's own output, there will also be reduced demand for imports.[54]

It is difficult to attribute all of the inflation to oil price increases, particularly in Canada. Many authorities are critical of government (both American and Canadian) ability to judge the appropriate time and by how much to expand and contract money. According to the Financial Times of London[55] there are two self-correcting mechanisms through which demand recovers after such an event as an oil shock: a drop in interest rates and deficit budgeting. Interest rates in Canada have fluctuated wildly during the past year. In addition, deficit budgeting has, in the past, been used extravagantly and indiscriminately. Deficits cease to be helpful "when the issuing of bonds to finance the deficits leads to a bidding up of interest rates."[56] The budget deficit process has been used unnecessarily and when it is seriously needed, as it is now, it is difficult for government to use the appropriate policy.

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[54] Cohen, p. 47.

[55] Ibid. Times study of recessions in OECD countries is quoted by Cohen.

It would seem that government control of money supply is not as 'controlled' as Chirot appears to imply. Nonetheless, the fact that government effort to control money supply does affect demand indirectly limits corporate power. In addition, government regulations imposed on corporations have cramped their unbounded power. Relative to the early twentieth century, the final tenet quoted from Chirot would be accurate. Few would deny that contemporary states are much stronger than they used to be.

In conclusion, regional nationalism in Canada is a historical phenomenon which has been rekindled in Alberta in the form of the struggle for resource control. The energy crisis, reduced demand and diminished American supremacy are all world system realities which are reflected in domestic politics and economics. Chirot's model appears to explain many current events in Canada. Regional ideologies, a definition of nationalism not accepted by large parts of the population, a drive towards internal consolidation and balanced economic growth and increasing state government control over corporate power are all features which seem to dominate Canadian politics in 1981.

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[56] Ibid.

World Systems and the Canadian University Education-Labour Market Relationship

The World Systems model developed by Chirot can be described as a general theory of social change. It is here employed as a vehicle to link change on a small scale to a larger theoretical model of social change. Within this framework, changes in the relationship between a university education and the labor market in Canada will be analyzed. The attempt is to apply at the micro level a macro theory which is of recent vintage and which has had limited application. In this context, changes in the relationship between a university education and the labor market will be viewed from the following perspective: Canada's relative position in the world system, the expansion and contraction phases in the American capitalist world system and the accompanying changes in class and culturally-based relationships, and finally, the relative position of Alberta in the Canadian "mini-world system" and the mitigating or exacerbating forces in Alberta which make the provincial labor market/university education link unique.

It was during the expansion phase in the American world capitalist system that the educational explosion in Canada reached a peak. By 1969, Canada devoted a higher percentage of her GNP to education than any other modern industrial nation (Table 1.2). Canada's position as a strong, open, semi-peripheral nation largely determined the direction of educational change during this expansion period. The open strategy encouraged extensive U.S. foreign investment in Canada particularly in the manufacturing sector of the economy. This injection of foreign money boosted the economy. Domestic investment in Canada has historically been moderate and restricted to aforementioned sectors of the economy. The American investments mainly via multinational corporations had an impact on the Canadian labor market. Not only did this foreign investment contribute to the growth of the labor force in general but it was also instrumental in raising the demand for highly educated manpower in Canada. The U. S. was experiencing a period of rapid and consistent economic growth unparalled in its history. Research and development spending was expanded to include Canadian subsidiaries of American firms. Technological and industrial advances demanded more highly-educated technological and managerial specialists.

In the area of migration, there was a two-way flow of "professional" migration between the U. S. and Canada from 1954 to 1967 (Table 1.1). Immigration Statistics (Employment and Immigration Annual) indicate more emigration to than immigration from the U.S. although the U.S. portion of professional immigrants doubled between 1964 and 1967. This two-way movement was compatible with the open Canadian strategy, with a rapidly growing labor force and with two booming economies and a high labor market demand for university trained manpower. This relatively unrestricted, two-way migration was also indicative of the presence of the "continental capitalist class" documented by Wallace Clement and consonant with Chirot's definition of intersocietal class action. Canada's very strong semi-peripheral status seemed to mitigate a one-way "brain drain" from semi-periphery to core. It would appear that geographic proximity, high labor market demand, high standard of living, adequate wages and almost identical economic growth rates (GNP per capita[57]) in both countries stimulated a two-way migration during the expansion period rather than the more typical dependency phenomenon of a "brain drain" into the core power anticipated by Chirot.

The Canadian government, in line with Chirot's thesis of a growing 'bureaucratic class', supported the demand for highly trained manpower by increasing spending on government research and development. In addition, the government poured generous financial allotments into the expansion of Canadian universities and other post-secondary institutions partly because of the prevailing belief that investment in human capital directly aided general economic growth.

The post-World War II "baby boom" in Canada paralleled a similar phenomenon in the U.S. Although the 'baby boom' was somewhat "boomier" in Canada, Chirot sees both patterns of birth rates in the twentieth century as reflecting a rapid change, industrialized, core position. It should be reiterated that Chirot classifies Canada as a core nation possibly because of economic similarities between the two countries. What Chirot ignores, however, is that these similarities were produced in Canada largely as a result of the dependence on U.S. foreign investment. Nonetheless, the population spurt in both countries provided an upward push as the system expanded to incorporate larger numbers of school children. At the post-secondary level, however, it was not so much the increase in the 18 to 24 year old population as much as increasing participation rates that forced the growth of the system. The predominant atmosphere of "stay-in-school-education-pays" seemed to be reinforced in the market place. The wages of university graduates during the 1960s were consistently high when compared to average industrial earnings. The latter provided convincing evidence that the 'rate of return' (with which government agencies became increasingly preoccupied) justified the foregone earnings of the added years in the education system.

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[57] Chirot, p. 157.

Indirectly, however, the "baby boom" did stimulate the university labor market by providing more employment for college graduates. The mushrooming school system demanded many teachers which in turn required a larger university education faculty. School construction employed more architects, engineers and business managers while the system also required a larger complement of educational administrators. Thus, as participation rates and actual graduations grew, the latter were readily absorbed into the labor market particularly in the early expansion years. The expansion of the post-secondary educational system was paralleled by the expansion of the American capitalist world system. As long as the U.S. (and its main economic instruments - the multi-nationals) had access to large quantities of raw materials (particularly oil), cheap labor, skilled professional manpower, markets for its exports and many areas around the world where investment capital could make enormous profits, the economic expansion suffered few, if any, major setbacks. As long as Canada remained open it shared some of these growth benefits and accepted the role of cultural as well as economic protege.

What were the main class and cultural relationships during this expansion phase? Chirot outlines the cultural dominance of the U.S. core whereby the core by example, if not by force, causes other societies to change. Canadian literature suggests that the expansion of the American higher educational system was the model which some Canadian planners tried to emulate. When the Economic Council of Canada recommended that Canadians close the education gap with the U.S., few seemed to question the value of such a stance.[58] Cultural dominance goes hand-in-hand with economic dominance.

The gains in accessibility to postsecondary institutions made by females during the expansion phase can be viewed as an additional example of cultural dominance primarily because the Canadian movement was a cultural spin-off from the U.S. Media coverage of women's issues is also largely influenced by the U.S. whose feminist leaders are often adopted in lieu of Canadian prototypes. The women's movement may also be defined as a class based phenomenon. There is little doubt that the movement carries class implications. Women have historically tended to "share a common position within the economic system" and the majority of women in the industrialized, western nations formed an intersocietal class by virtue of this common economic position. The women's movement cultivated female groups devoted to class action, that is, improving the economic position of women in society. There is no doubt that the expansion period in post-secondary education, particularly during the 1960s, witnessed an increasing volume of female participants in all avenues of post secondary education. This gain in access to higher education by females may be cited as a class movement as well as an illustration of cultural dominance.

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[58] Economic Council of Canada, Second Annual Review, 1965, pp. 191-92.

Women, however, were not the only group gaining increasing access to post secondary education in the expansion period. During the 1950s, francophones lagged behind other Canadians in general educational level. In the subsequent decade, the expansion of the postsecondary educational system in Quebec, particularly after the establishment of the Universite de Quebec and the rapid spread of the CEGEPs, was dramatic. More French-speaking Quebecers were admitted to universities and their choice of programs shifted from traditional to more modern, industrial professions. The changes in the university system in Quebec can be interpreted as one result of the cultural conflict between the anglophone and francophone communities in Canada. Although these conflicts are undermined with class concerns, it is fair to suggest that conflict between the French and English sectors in Canada provide a striking example of Chirot's culturally based conflicts and of advances made by a culturally mobilized group.

Gains in access to higher education were also made by those from lower socioeconomic backgrounds. Edward Harvey[59] has documented that during the 1960s the upwardly mobile expanded the ranks of a growing middle class using the university and other postsecondary institutions as stepping stones. Gains by this group, however, were less dramatic than those made by women and francophones in the university sector in Canada. Students from lower classes tended to be found in colleges and technical institutes rather than in universities. Nevertheless, increased participation in university education by working classes also contributed to the rising general educational levels and 'credentialism.'

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[59] Edward T. Harvey, Educational Systems and the Labor Market.

In summary, the expansion of the American world capitalist system supported the expansion of the university system in Canada. As an open country to U.S. investment, Canada shared the boom, albeit in a more modest manner. The growth in the Canadian labor force, which includes a growing number of skilled professionals, surpassed all of the major western nations.[60] This rapid growth would have been very unlikely if Canada had adopted a closed policy (as much of the communist world has done) to the world capitalist system. Closure carries problems (at least in the short run) of foreign investment drying up, vanishing imports, few export markets available and a falling standard of living, all of which tend to stir national discontent and slow economic development.

As a result of an open strategy, then, the Canadian labor market was able to absorb the increased university output because demand for university manpower remained high. Because demand was high, employers continued to pay higher wages to university graduates relative to average industrial earnings. More people from lower classes joined the ranks of the educated. This increase in the middle class is consistent with Chirot's thesis that granting a share of the privilege to this group (via wages) is stabilizing to the American capitalist world system. The degree to which educational gains were made in Quebec may be interpreted as a drive by a semi-peripheral state towards internal consolidation.

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[60] Statistics Canada, Out of School - Into the Labor Force, p. 160.

Even before the 1973 oil cartel, the "contraction" in the American world capitalist system began. As a semi-peripheral, U.S. dependent nation, Canada experienced an echo contraction. The manufacturing core in Canada felt reduced demand through cutbacks in production, threats of branch-plant closures and the decline in R & D spending in the manufacturing sector.

The general university labor market in Canada has reflected these changes. As industry research and development in Canada began a decline at the end of the 1960s, demand for these highly skilled specialists began to drop, partly because of the large numbers absorbed in the immediate past into these sectors. There were anomalies in these labor market trends, however. The demand for university trained manpower in the environment and energy sectors has shown a more consistent growth than other specialties. This is to be anticipated because of the national drive for energy self-sufficiency and the attendant environmental problems.

The decreased demand for university trained manpower, particularly in the education and general arts and science sectors, seemed to promote political disenchantment with the formerly prevalent belief that higher educational levels contributed directly to the economic growth of the nation. This was reflected in bureaucratic policies reducing the total percentage of the GNP devoted to education. In addition, government spending on research and development was reduced, further constricting demand for highly trained manpower. One could speculate that Chirot's concept of a "bureaucratic class" responding to public sentiment to guarantee its own political survival may have been an additional reason for reduced financial support to higher education.

The effects of the contraction were also reflected in immigration policy changes. Since both Canada and the United States were experiencing similar university labor market problems,[61] the two-way professional migration was restricted in the early 1970s. Both governments declared that professional immigrants would only be permitted to assume jobs for which no suitable indigenous candidate could be found. Free movement of professional manpower across the border was thus curtailed. At the same time, the "continental capitalist class" was self-reinforcing in the energy sector and demand in this area was high permitting more flexible border movement of energy specialists. As a result, current federal government policies for more energy self-determination have initiated the "brain drain" phenomenon from semi-periphery to core described by Chirot. The Reagan administration move to lift price controls and increase domestic production of oil have created a shortage of U.S. university trained specialists in this field. While a similar shortage exists in Canada, greater profits accrue to Canadian drilling industries and specialists moving to the U.S. because of the U.S. policy to allow energy prices to rise to world levels. Barring any reversal in these pricing policies, a shortage of energy specialists in Canada should continue for some time.

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[61] The U.S. demand for college and university trained manpower declined sharply. It must be remembered, however, that the percentage of the 18 to 24 year old population in the U.S. who obtain these levels of training is much higher than in Canada.

As if in response to the declining demand, participation rates in universities began to stabilize during the early 1970s. At the same time, the ratio of starting salaries of university graduates to average industrial earnings began to drop.[62] Moreover, the last of the "baby boom" children had entered the school system. This growth sector began to stabilize and, in the mid-seventies, decline. One more market for university trained manpower was shrinking. The diversion of money to energy from a variety of other goods and services further reduced demand for highly trained manpower from the non-energy related fields.

The decline in U.S. international power and reputation appears to have had a greater economic than cultural impact on Canada. While U.S. media influence remains pervasive in Canada, the Canadian federal government appears to be attempting to mitigate the predominant foreign control in the oil industry. Current moves by Petro-Canada, such as the acquisition of Petrofina, indicate a move to a more closed policy in regard to foreign investment in Canada. If Chirot's thesis is correct, one may anticipate that a more closed attitude to cultural dominance will follow these economic measures. In the short run, economic closure has a dramatic impact on the labor market. Federal energy policy has already reduced demand by creating an atmosphere which is unconducive to foreign investment.

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[62] Statistics Canada, Out of School-Into the Labor Force, p. 187.

The women's movement has further exacerbated the university labor market decline during the 1970s because of the increasing participation of women in both the higher educational system and the professional labor market. This continental trend suggests the pervasive cultural impact of the U.S. on Canada.

Stabilized participation rates in universities has narrowed this avenue of upward mobility for the working classes. It may well be that the cost of coopting this group became too costly to serve a worthwhile purpose. At any rate, when starting wages for university trained manpower dropped relative to average industrial wages and demand declined, participation by lower classes appeared to decline. For lower class participants, it would seem that the potential benefits to be gained from a university education must be sufficient to offset the foregone earnings during the extra years of education.

In conclusion, the international economic situation, the contraction in the American world capitalist system and the energy crises of 1973 have all contributed to a slow down in economic growth in Canada, a semi-peripheral member of the world capitalist system. The conclusion that is put forth is that position and events in the world capitalist system have a direct bearing on the supply of and demand for university trained manpower in Canada.

The Alberta University Education-Labor Market Relationship

The basic model has been given a Canadian application. What remains is to outline those features of the model which would be relevant to the specific position of Alberta in the Canadian mini-world system and what this position would suggest about the university education/labor market link in Alberta. To provide a concise framework for further referral, listed are several propositions which are based on the model. These propositions are expectations which the model would suggest for Alberta.

1. That during the expansion period in the world capitalist system Alberta's peripheral position to a central Canadian core would suggest economic as well as cultural dominance including:

   a. General Canadian economic growth producing similar patterns of supply and demand for university educated manpower across Canada.

   b. Highest demand in the more developed core producing "brain drain" phenomenon from Alberta to central Canada.

   c. Cultural dominance in which periphery accepts prevailing core rationale for higher educational expansion.

2. That the contraction period in the world capitalist system has brought an unanticipated economic surge to Alberta's relative position in the Canadian mini-world system. Alberta is now a strong semi-periphery in which unique labor market trends might be anticipated.

3. That labor market growth in Alberta has been, for economic reasons, consistently high including the "professional" or university trained market.

4. That demand for university trained manpower will remain high because of a growing economy, research and development activity and energy mega-project construction.

5. That consistent high demand will keep starting salaries for univer-

sity graduates relatively high compared to average industrial earnings.

6. That participation rates and actual enrolments in Alberta universities have and will continue to grow because of available job opportunities and higher relative incomes for professionals.

7. That gains in access to universities will continue to be made by females and lower classes as enrolments grow.

8. That high labor market demand for university trained manpower in Alberta, coupled with lowered demand in other areas of Canada, should bring professional migration to Alberta - a reverse brain drain to a strong semi-periphery.

9. That cultural and economic dominance by the core will continue to be manifested by a drive for "internal consolidation" with more balanced Canadian growth. Power struggles between core and semi-periphery may possibly mitigate demand for skilled manpower in Alberta as core asserts economic dominance, possibly through resource taxation.

10. That cultural dominance of Alberta by a central core would be apparent if general Canadian supply trends in higher education were duplicated in Alberta while the province was simultaneously experiencing anomalies in labor market growth and demand for university trained manpower.

11. That cultural dominance would also be reflected in similar patterns of financing for higher education in Alberta and the remainder of Canada.

12. That generally, in comparison with Canadian trends, all university trained manpower in Alberta will be in high demand subsequent to the beginning of the economic boom. That is, there should be no long term

surplus of teachers in Alberta due to in-migration. Migrants tend to be young adults in the prime child rearing ages. Particular disciplines, such as engineers, geologists, petroleum geophysicists, accountants, business administrators and computer programmers are likely to remain in very high demand in Alberta due to the nature of the resource economy and the mega-projects that are planned.

CHAPTER III

SUPPLY TRENDS FOR UNIVERSITY TRAINED MANPOWER

INTRODUCTION

This chapter is designed to identify the major demographic trends and enrolment patterns that have touched the universities in Alberta over the past two decades. By 1971, there was much national speculation about a possible glut of university graduates on the labor market. Public support for universities began to wane as the economic returns from a university education were questioned. In fact, surprisingly little is known about the state of the university graduate labor market during the 1970s, particularly in Alberta which was somewhat of an economic anomaly in Canada during that decade. Further, there were few attempts to relate demographic data to enrolments. As a result, events during the past decade seemed to catch administrators and planners unaware and without any long-range plan. The supply analysis in this chapter is an attempt to fill the gaps in that knowledge through a detailed and objective analysis.

The first function of this chapter is to examine the impact of fertility rates and migration on the Alberta university age cohort and to review past and project future university participation rates from this population group. The emphasis will be on the post-1970 period. It is assumed that Alberta will demonstrate unique trends because of the significant increase in net migration during the last half of the decade.

A second function of this chapter is to explore student changes in age and sex distribution. Changes in sex ratios have important social implications and age changes are likely to alter the target population that university administrators have concentrated on in the past.

A third factor isolated is the variation in university discipline choices over time. Student selection of a faculty has a major impact on the labor market after the appropriate lag period. It is also a critical variable in any attempt to ascertain if students are responsive to the labor market conditions at a particular point in time. Does supply change in relation to perceived market demand?

Finally, changes in the characteristics, specialties and numbers of university students are analyzed in a world systems framework to determine if a theory of general social change is appropriate to explain the changes in the university graduate/labor market link in Alberta.

POPULATION

One aspect of population that is important to the universities is the size of the 18 to 24 year old age group. The size of a population is influenced by fertility and births, mortality and migration.

Fertility and Births

To date, approximately 80 percent of full-time postsecondary students fall within the 18-24 or 17-23 age group.[1] Fertility and the number of births have a large impact on this age group size. However, the impact is felt after an approximate 18 year lag when students enrol as freshmen.

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[1] Statistics Canada, The Class of 2001: The school-age population-Trends and implications - 1961 to 2001, February, 1979, p. 15.

In the past the fertility rate[2] and the number of births have varied greatly. One result has been the population wave phenomenon in which a birth cohort swells each successive age group as they mature. In Alberta the total fertility rate demonstrated a "trough" trend between 1921 and 1938 and an upward swell between 1938 and 1961 subsequently followed by a plummeting trend to the present day. Figure 3.1 shows the fluctuating fertility rate for Alberta from 1921 to 1975, demonstrating the surge referred to as the postwar baby boom. Figure 3.1 also provides projections to the year 2001 which incorporate two fertility assumptions: high fertility in projections 1 and 2, low in 3 and 4. All the projections indicate a stable current fertility rate when compared to the earlier fluctuating fertility rates.

The same wave phenomenon is observable in the data on live births in Figure 3.2. The projections, however, demonstrate an increase in live births in Alberta in spite of the declining fertility rate. "Alberta was the only province in Canada to register a significant percentage change, +10.7 per cent in live births"[3] from 1970 to 1978. Quebec was a distant second at +3.4 per cent change in live births during the same interval. The increase in live births, coupled with the declining fertility rate, occurs because the baby boom children have reached the most

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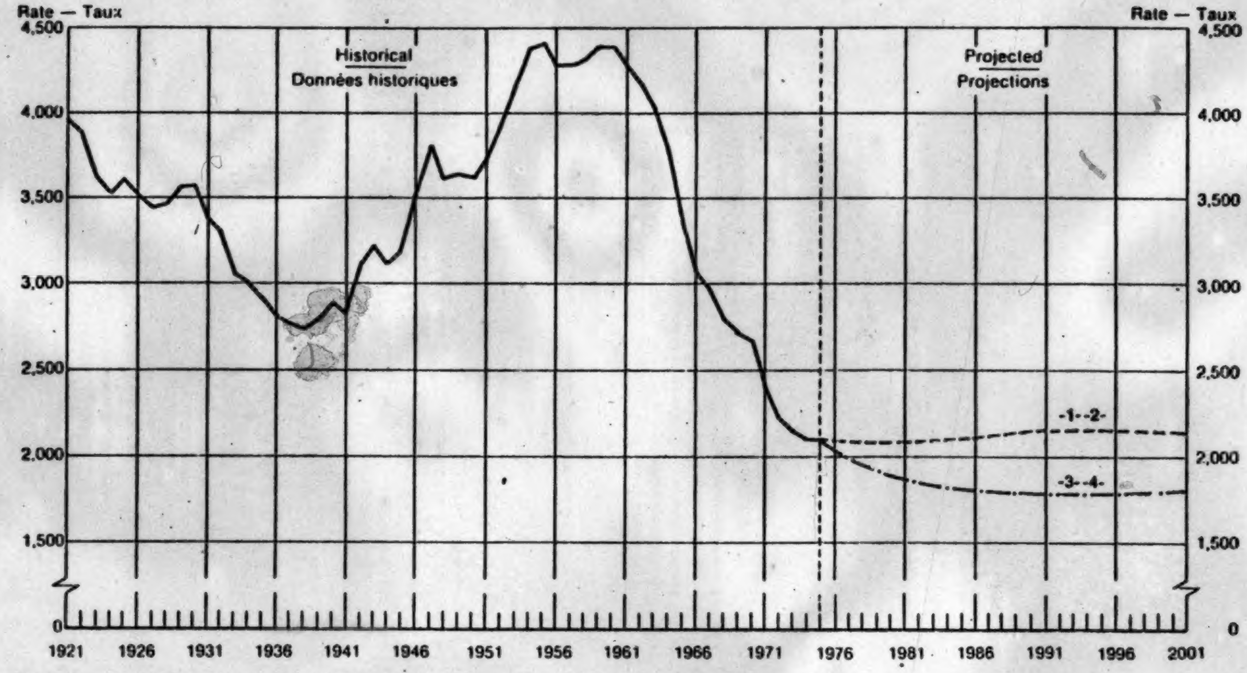
[2] The fertility rate is the average number of children per 1,000 women born through the childbearing ages.

[3] Loken, p. 8.

Figure 3.1 Alberta Total Fertility Rate, 1921 to 1975 Projected to 2001



ALBERTA

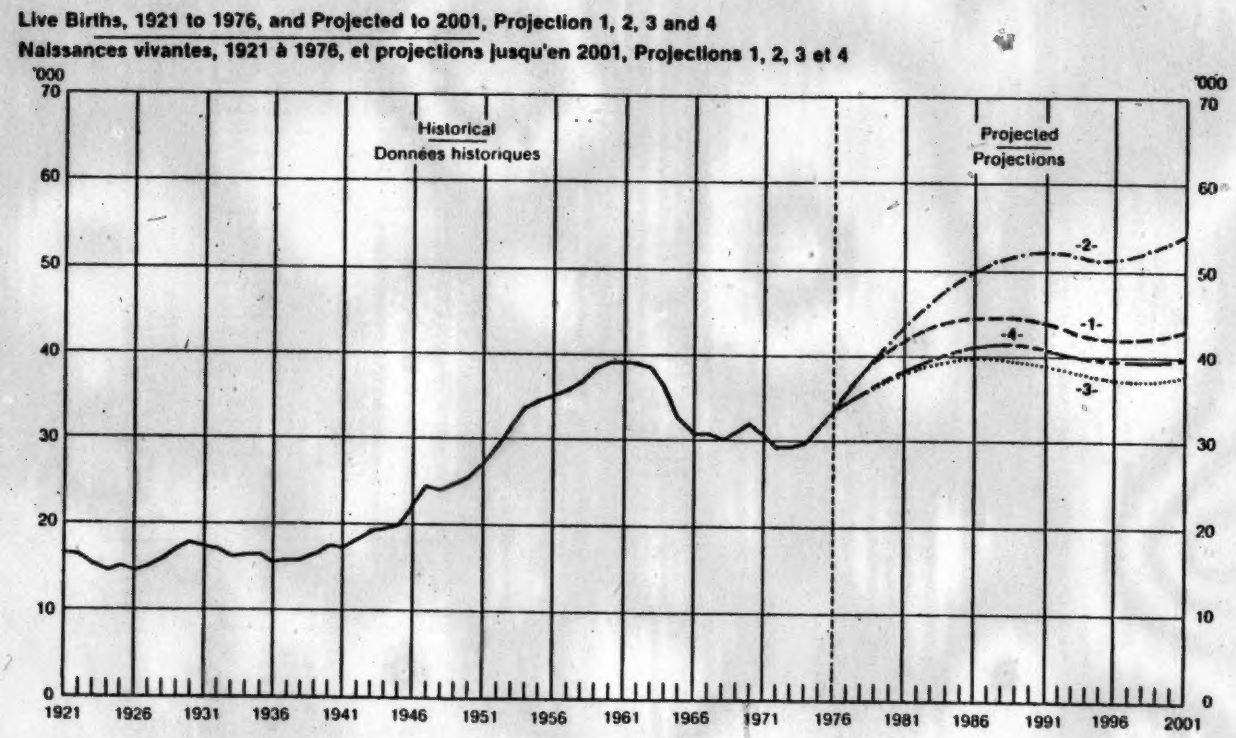
Total Fertility Rate[1], 1921 to 1975, and Projected to 2001, Projections 1, 2 and 3, 4

Indice synthétique de fécondité[1], 1921 à 1975, et projections jusqu'en 2001, Projections 1, 2 et 3, 4

(1) Average number of children per 1,000 women born through the childbearing ages (15-49) — Nombre moyen d'enfants pour 1,000 femmes, nés durant la période de procréation (15 à 49 ans).

Source: W. Clark, M. S. Devereaux, and Z. Zsigmond, The Class of 2001. Statistics Canada, Education, Science and Culture Division, February, 1979, p. 50

Figure 3.2 Alberta Live Births, 1921 to 1976, Projected to 2001



Live Births, 1921 to 1976, and Projected to 2001, Projection 1, 2, 3 and 4

Naissances vivantes, 1921 à 1976, et projections jusqu'en 2001, Projections 1, 2, 3 et 4

Source: W. Clark, M. S. Devereaux, and Z. Zsigmond, The Class of 2001. Statistics Canada, Education, Science and Culture Division, February, 1979.

fertile age group (20-29) and an "echo" boom ensues. If fertility rates decline at a faster rate than predicted, the effect of the "echo" boom will be less pronounced or closer to projection 3.

Fertility rates and live births are significant for the enrolment trends in university. They are one component used in calculating that proportion of the population in the 18 to 24 year old age group which in the past has made up the aforementioned 80 percent of postsecondary enrolments. Using fertility and births, one is able to predict with reasonable accuracy when the numbers of any age group will swell or decline. Figures 3.1 and 3.2 indicate that fertility and live births, both of which crested between 1955 and 1961, would swell the 18 to 24 year old age group to a peak in the early 1980s. That is, the postwar babies have now reached postsecondary education age. Thus, the *potential* for increased university enrolment based on a larger pool of age-eligible population due to natural increase is greater between 1981 and 1983 than it was during the preceding two decades. A subsequent decline is expected until 1992 with another swell between 1992 and 2001.

Mortality

Since the population important in this research is a young adult category, mortality is of little concern. Youth mortality rates are so low as to have an insignificant reduction effect on a school age population.

Migration

In Alberta, natural increase (births less deaths) since 1971 has become a shrinking percentage of Alberta population growth. Migration has assumed a more significant role. This is particularly true with respect to interprovincial migration. In this province, a large component which impacts on the size of the 18-24 year old group is net migration. Figure 3.3 provides a diagrammatic picture of the degree to which interprovincial migration has become the predominant component of population growth in Alberta over the past decade. This is particularly true of the young adult category. The majority of migrants tend to fall in the 20 to 30 year old age category. For example, the 20-24 year old age group represents the largest single cohort of migrants to Alberta followed by the 25-29 year old group. In any given year in Alberta, 21 percent of the total net in-migration is in the 18-24 year range.[4] This migration tends to inflate the ranks of the university age population while migrants move primarily to seek employment.

Projections of school age populations for Canada and each province are contained in Statistics Canada's The Class of 2001. Four different projections are based on different assumptions about life expectancy at birth, total fertility rate and net migration. Table 3.1 indicates the assumptions used in the projections. Projection I for Alberta lists a fifteen year average net migration (1976-91) at 16,800 while Projection 2 for the same period is 38,000. This difference between the highest and lowest projections of net migration is fairly large. Therefore, depending on which projection is adopted there will be a fairly wide variation in the projected 18 to 24 year old population. Table 3.2 gives actual historical net migration among provinces as a basis for comparison.

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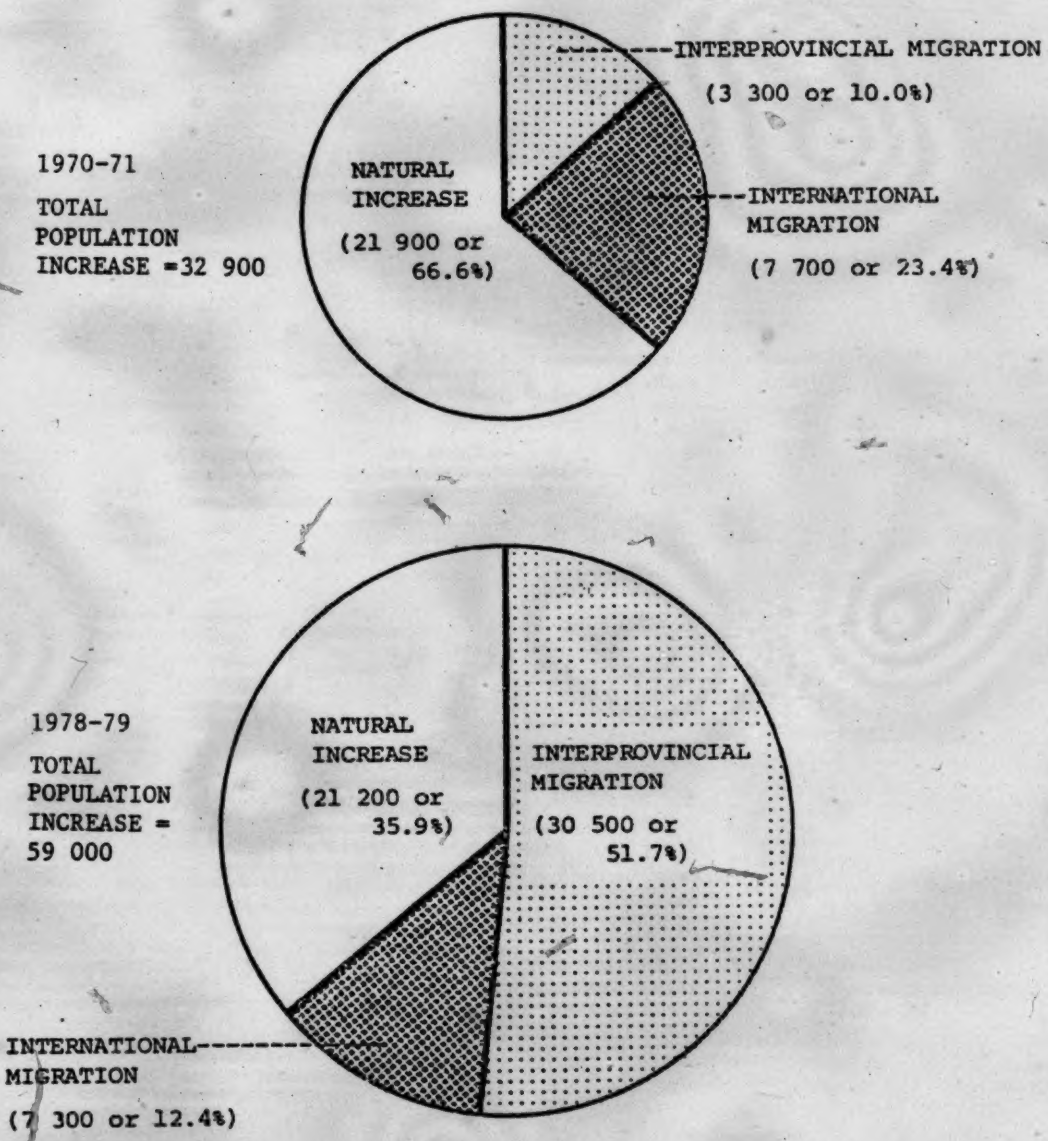
[4] Alberta Bureau of Statistics, Table 25. Reproduced in Loken, Appendix A.

Figure 3.3.

COMPONENTS OF POPULATION GROWTH

ALBERTA



Source: Alberta Advanced Education and Manpower, Planning Secretariat, Demographic and Manpower Trends in Alberta: Possible Impact on the Advanced Education System, 1971-1988, May, 1980, p. 11.

Note: The statistics used in this figure are based upon May 31st year endings.

TABLE 3.1

Life Expectancy at Birth, Total Fertility Rate and Net Migration Assumptions, Canada and Provinces

Espérance de vie à la naissance, indice synthétique de fécondité et migration nette hypothétique, Canada et provinces

Province	Projection	Total fertility rate — Indice synthétique de fécondité		Net Migration — Migration nette				Life expectancy at birth (years) Espérance de vie à la naissance (années)			
				Five year averages Moyennes quinquennales			Fifteen year averages Moyennes sur quinze années	Male — Hommes		Female — Femmes	
		1976	1991	1976–81	1981–86	1986–91	1976–91	1976	1986	1976	1986
Ontario[1]	1	1.8	2.0	57,500	71,900	70,100	66,500	69.89	70.62	77.43	79.15
	2	"	"	32,300	23,900	18,000	25,000	"	"	"	"
	3	1.8	1.6	40,500	48,000	47,500	45,300	"	"	"	"
	4	"	"	23,500	24,500	25,200	24,400	"	"	"	"
Manitoba	1	2.1	2.1	−1,400	−3,400	−2,700	−2,500	70.50	71.32	77.59	79.34
	2	"	"	−1,000	−1,600	−1,700	−1,500	"	"	"	"
	3	2.0	1.8	−1,400	−2,100	−1,400	−1,600	"	"	"	"
	4	"	"	−1,500	−900	−500	−1,000	"	"	"	"
Saskatchewan	1	2.2	2.3	−800	−9,700	−8,000	−6,200	71.44	72.67	78.02	79.53
	2	"	"	3,400	−1,000	−3,100	−200	"	"	"	"
	3	2.2	1.9	1,800	−2,900	−2,300	−1,100	"	"	"	"
	4	"	"	4,500	4,000	3,600	4,000	"	"	"	"
Alberta	1	2.1	2.1	28,900	11,500	9,900	16,800	70.85	71.83	77.83	79.34
	2	"	"	37,800	39,700	39,000	38,800	"	"	"	"
	3	2.0	1.8	31,100	20,800	18,500	23,400	"	"	"	"
	4	"	"	33,100	29,600	26,400	29,700	"	"	"	"
British Columbia — Colombie-Britannique	1	1.8	2.0	25,900	36,900	35,500	32,800	70.01	70.47	77.50	70.33
	2	"	"	18,500	28,100	33,900	26,800	"	"	"	"
	3	1.8	1.6	18,700	24,600	24,300	22,500	"	"	"	"
	4	"	"	11,700	12,600	13,600	12,600	"	"	"	"

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[1] The assumptions for Ontario differ somewhat from those used by Dr. R.W.B. Jackson in his report for The Commission on Declining School Enrolments in Ontario. Projections 3 and 4 in this study are close to those used by Dr. Jackson. Readers from Ontario are encouraged to examine the population projections from both studies.

Les hypothèses pour l'Ontario diffèrent quelque peu de celles qui ont été employées par R.W.B. Jackson dans son rapport présenté à la Commission d'enquête sur la diminution des effectifs scolaires en Ontario. Les projections 3 et 4 de la présente étude se rapprochent de celles de M. Jackson. Les lecteurs de l'Ontario auraient avantage à examiner les projections des deux études.

TABLE 3.1 (Cont.d.)

Life Expectancy at Birth, Total Fertility Rate and Net Migration Assumptions, Canada and Provinces

Espérance de vie à la naissance, indice synthétique de fécondité et migration nette hypothétique, Canada et provinces

Province	Pro-jection	Total fertility rate — Indice synthétique de fécondité		Net Migration — Migration nette				Life expectancy at birth (years) Espérance de vie à la naissance (années)			
				Five year averages Moyennes quinquennales			Fifteen year averages Moyennes sur quinze années	Male – Hommes		Female – Femmes	
		1976	1991	1976–81	1981–86	1986–91	1976–91	1976	1986	1976	1986
Yukon	1	2.4	2.3	400	700	500	500	65.10	68.18	69.54	72.97
	2	"	"	300	400	400	300	"	"	"	"
	3	2.3	1.9	300	400	300	300	"	"	"	"
	4	"	"	200	200	100	200	"	"	"	"
Northwest Territories – Territoires du Nord-Ouest	1	3.1	2.6	800	1,200	800	900	62.70	65.78	66.90	70.94
	2	"	"	500	600	500	500	"	"	"	"
	3	3.0	2.2	600	700	400	600	"	"	"	"
	4	"	"	300	200	100	200	"	"	"	"
Canada	1	1.9	2.1	100,000	100,000	100,000	100,000	69.61	70.22	76.90	78.26
	2	"	"	75,000	75,000	75,000	75,000	"	"	"	"
	3	1.9	1.7	75,000	75,000	75,000	75,000	"	"	"	"
	4	"	"	50,000	50,000	50,000	50,000	"	"	"	"

Source: W. Clark, M. S. Devereaux, and Z. Zsigmond, The Class of 2001. Statistics Canada, Education, Science and Culture Division, February, 1979.

Table 3.2 Net Migration (International and Interprovincial) of Children and Adults 1961–62 to 1977–78

Year	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont. (Thousands)	Man.	Sask.	Alta.	B.C.	Yukon & N.W.T.	Canada
1961–62	−2.0	+0.5	−4.3	−4.7	−2.3	+13.5	−1.7	−12.5	+6.6	+2.8	+0.2	−4.0
1962–63	−3.3	−1.0	−6.9	−7.3	−3.3	+25.9	−2.4	−14.0	+3.8	+9.2	−1.0	−0.4
1963–64	−5.2	−1.0	−7.6	−8.7	−6.6	+45.6	−4.8	−9.1	−1.9	+16.9	−1.5	+16.0
1964–65	−7.0	−2.0	−10.2	−7.0	−6.8	+57.3	−7.9	−8.5	−5.0	+24.5	−1.9	+25.4
1965–66	−6.3	−1.4	−9.0	−7.4	−2.9	+82.3	−12.9	−10.5	−8.0	+46.3	−0.8	+69.6
1966–67	−7.2	−1.1	−8.6	−9.7	−2.5	+105.1	−8.9	−10.8	+5.9	+48.6	−0.8	+110.1
1967–68	−5.2	−0.5	−4.7	−6.1	−10.1	+80.2	−1.5	−9.5	+15.2	+34.1	+0.5	+92.6
1968–69	−2.7	−0.9	−2.5	−7.2	−11.5	+66.4	−1.3	−12.6	+16.5	+34.6	+0.9	+79.7
1969–70	−8.6	−1.9	−3.3	−9.9	−35.2	+103.9	−5.0	−25.4	+16.7	+43.0	+1.5	+75.7
1970–71	−5.2	+0.0	−4.2	−1.4	−40.8	+90.3	−3.6	−24.6	+13.5	+33.0	+3.0	+59.9
1971–72	+1.0	+0.4	+0.4	+1.1	−17.7	+46.6	−5.6	−19.4	+7.0	+36.0	+2.0	+51.7
1972–73	−0.4	+1.0	+5.3	+2.9	−15.6	+41.8	−2.6	−16.2	+10.0	+40.2	+1.8	+68.1
1973–74	−3.0	+0.8	+3.1	+2.8	−2.0	+78.5	+3.0	−11.5	+9.4	+50.4	−1.1	+130.3
1974–75	+0.7	+1.6	+3.6	+7.5	+4.1	+49.9	−2.3	+0.8	+32.2	+34.4	+1.0	+133.5
1975–76	+0.9	+0.8	+4.8	+7.9	−1.0	+32.7	−0.1	+6.8	+35.5	+11.3	+0.6	+100.2
1976–77	−1.6	+1.1	+0.8	+3.2	−9.6	+28.1	−0.8	+7.2	+36.1	+9.5	−1.4	+72.5
1977–78	−3.1	+0.9	+0.5	+1.5	−45.0	+29.7	−4.6	+2.1	+34.0	+19.2	−0.4	+34.7

Note: Data include estimates for emigration and adult interprovincial movement. The emigration estimates for 1961–62 to 1976–77 have been revised in the light of results from the 1976 Census. Year refers to the Census year June 1st to May 31st. Provinces may not add to Canada due to rounding.

Source: Statistics Canada, International and interprovincial migration in Canada, Catalogue 91–208.

Impact of Fertility, Live Births and Net Migration on the Postsecondary Age Group in Alberta

When compared to the remainder of Canada, Alberta's net migration, total fertility rate and number of live births are high. This is particularly true in light of changes that have occurred during the past decade. It is necessary to examine how these demographics impact on the postsecondary age group in particular and universities in general.

Table 3.3 highlights the changes in the postsecondary age population from 1961 in the provinces and territories. It also identifies the peak (postwar baby boom peak) and trough years in this age group population. The projected population to 2001 identifies anticipated future trends in the postsecondary "waves." Between 1961 and 1978 Alberta is listed as experiencing a 123.2 percent increase in the postsecondary age group. This is second to the 138.9 percent increase in British Columbia but considerably above the national average increase of 86.9 percent. The postsecondary population in all the provinces are expected to peak between 1980 and 1983. Alberta's peak year is anticipated to be 1983, a year later than the national average. In 1983, then, it is projected that there will be 300,900 postsecondary age students in Alberta compared with 281,700 in 1978. The trough year for Alberta is expected to be 1992, somewhat earlier than the remainder of the provinces. However, the trough is less pronounced relative to the other provinces. Moreover, the swell to 2001 in Alberta, an 11.8 percent increase from trough to 2001, is greater than the national average of 6.4 percent.

It would appear that over time Alberta has experienced a larger

TABLE 3.3 Turning Points in Post-secondary Age Groups by Province

Province	Post-secondary Age Group	Population 1961	Projected Population 1978	% Change From 1961 to 1978	Peak Year	Projected Population Peak	% Change From 1978 to Peak	Trough Year	Projected Population Trough	% Change From Peak to Trough	Projected Population 2001	% Change From Trough to 2001
		'000	'000	%		'000	%		'000	%	'000	%
Nfld.	17–23	49.0	83.4	+70.2	1983	89.0	+6.7	1998	65.5	–26.4	66.0	+0.8
P.E.I.	18–24	9.5	16.5	+73.7	1983	18.6	+12.7	1997	13.4	–28.0	13.9	+3.7
N.S.	18–24	72.9	115.5	+58.4	1982	120.5	+4.3	1997	89.2	–26.0	92.8	+4.0
N.B.	18–24	56.4	98.2	+74.1	1982	103.1	+5.0	1997	78.3	–24.2	80.5	+2.8
Quebec	17–23	565.5	910.7	+61.0	1980	915.2	+0.5	1994	619.3	–32.3	669.2	+8.1
Ontario	18–24	548.6	1,111.9	+102.7	1983	1,192.9	+7.3	1996	990.8	–16.9	1,055.0	+6.5
Manitoba	18–24	85.3	137.9	+61.7	1981	140.7	+2.0	1997	109.6	–22.1	112.6	+2.7
Saskatchewan	18–24	83.7	128.8	+53.9	1982	134.9	+4.7	1996	99.1	–26.5	103.1	+4.0
Alberta	18–24	126.2	281.7	+123.2	1983	300.9	+6.8	1992	267.1	–11.2	298.6	+11.8
B.C.	18–24	136.7	326.6	+138.9	1983	351.3	+7.6	1995	300.2	–14.6	326.9	+8.9
Canada	18–24	1,712.6	3,201.0	+86.9	1982	3,362.0	+5.0	1996	2,653.2	–21.1	2,823.4	+6.4

Source: W.Clark, M. S. Devereaux, and Z. Zsigmond, The Class of 2001. Statistics Canada, Education, Science and Culture Division, February, 1979, p. 59.

Note: All projected data are taken from projection no. 3 which is not necessarily the best projection for all provinces. Projection no. 3 is used merely for illustrative purposes.

percentage increase in the postsecondary age group than most of the provinces and is unique in the small decline anticipated in this population in 1992. It should also be pointed out that the figures, drawn from The Class of 2001, are those of Projection 3 shown in Table 3.1. This projection is somewhat conservative for Alberta. It is based on a declining fertility rate, from 2.1 in 1976 to 1.8 in 1991 and modest estimates of net migration. For example, the five year projected net migration average of 31,100 between 1976-81 is low in light of the actual figures released by the Alberta Bureau of Statistics for the 1976 to 1980 period. Average annual net migration for the four years 1976 to 1979 inclusive was 39,468.[5] In addition, for the first two quarters of 1980, net migration was higher than these same quarterly totals during the preceding four years. One could conclude that the projections for Alberta are not the most optimum. Projection 3 was selected by Statistics Canada because it was considered the most reasonable projection at the national level. The charts in this chapter utilizing projection 3 for Alberta should thus be viewed as conservative estimates. However, even conservative estimates show postsecondary age group growth as high in Alberta when compared to the remainder of Canada. The fact that Alberta estimates are likely to be consistently understated, however, cannot be emphasized too much. Statistics Canada data, used in this research as well as by many branches of federal and provincial governments, have a far-reaching and diversified impact. The population projections, for example, are used to estimate school enrolments as well as labor force growth over time. Therefore, much of the data which are here employed will tend to understate labor force growth, growth of certain occupations as well as the selected postsecondary aged population. Following logically, university enrolments may possibly begin to show larger gains than earlier conservative projections would suggest.

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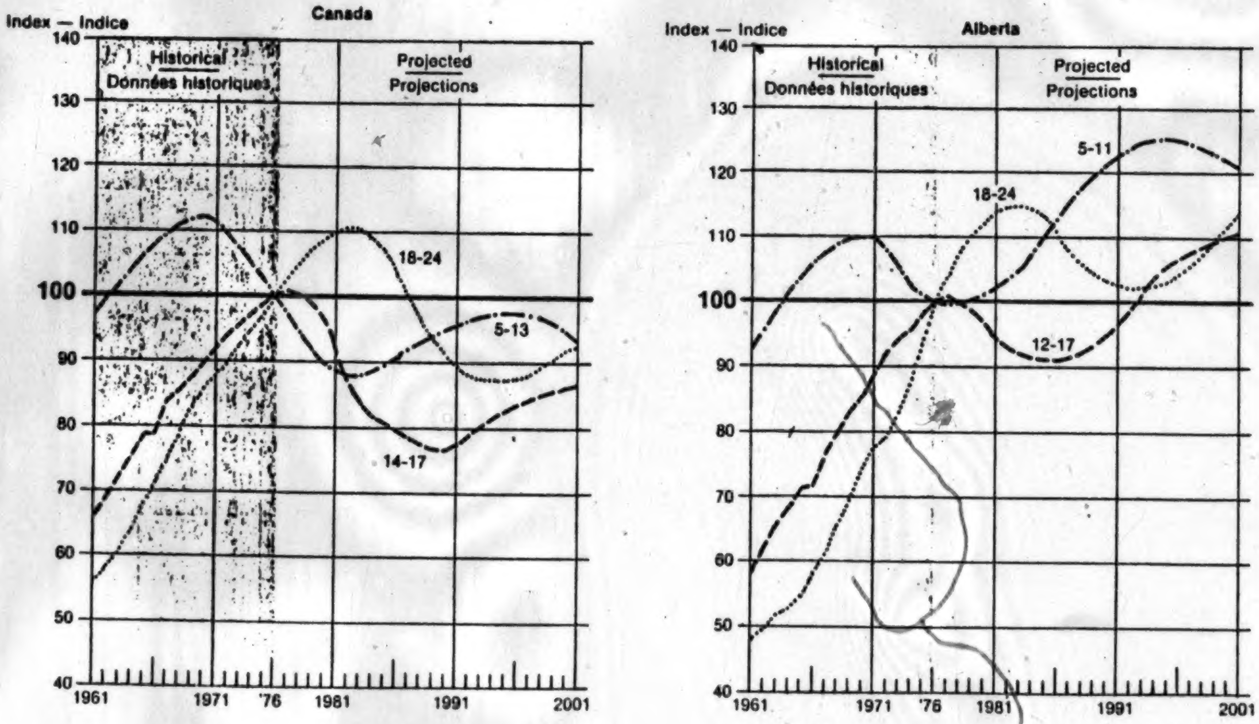
[5] Alberta Bureau of Statistics, Economic and Demographic Model Unit.

To make national or provincial comparisons of school age populations, it is more expedient to use index numbers. In Figure 3.4 the index values prevent the distortion produced by different scales. The selected index is the size of a population in any year between 1961 and 2001 as it compares to that group's size in 1976 (1976=100). Three separate school age populations are included in the chart. Such an index facilitates a quick determination of the percentage change in any school age group. For example, Alberta's index for the 18 to 24 year old age group is 115 in 1983. This indicates a 15 percent increase in that population since 1976. This growth is greater than the anticipated national average. Moreover, the expected, subsequent decline in the 1990s is much greater at the national level than in Alberta.

Figure 3.4 denotes that the postsecondary population in Alberta at its lowest projected point in 1992 is anticipated to remain above the level reached in 1976. The latter year was the highest full-time enrolment year in Alberta universities. In all provinces (excluding Yukon and North West Territories) except Alberta, the postsecondary population is expected to drop below the 1976 figure during the trough period. Compared to the national chart, Alberta shows a higher percentage increase to the peak, a lower percentage decline to the trough, and a

FIGURE 3.4 TRENDS IN SCHOOL-AGE POPULATIONS, EXPRESSED IN INDEX NUMBERS, PROJECTION 3 (see text)



(1976 = 100)

Source: W. Clark, M. S. Devereaux, and Z. Zsigmond, The Class of 2001. Statistics Canada, Education, Science and Culture Division, February 1979, pp. 62, 63.

steady upturn during the "echo boom" which exceeds the national trend.

Based primarily on a conservative projection for Alberta, the demographic outlook for the 18-24 age eligible population appears much more favorable than that for other provinces. The potential for full-time enrolment in universities is therefore very promising. At least, one may anticipate less institutional strain in Alberta during the decline period which is expected to be more pronounced in other provinces.

The purpose of this demographic analysis has been to measure the potential impact on the universities in Alberta. However, the changing demographic profile of Alberta and rapid in-migration do not necessarily have a large impact on the universities. They do, nevertheless, provide support for the world systems theory of social change. One of the propositions derived from that model was:

> 2. That the contraction period in the world capitalist system has brought an unanticipated economic surge to Alberta's relative position in the Canadian mini-world system. Alberta is now a strong semi-periphery in which unique labor market trends might be anticipated.

The foregoing demographic analysis suggests that Alberta's strong, relative economic position has created a buoyant labor market. The large net migration and low unemployment rate between 1975 and 1980 also support the theory that Alberta's labor market is unique in Canada.

HISTORICAL UNIVERSITY PARTICIPATION RATES IN ALBERTA

Participation rates are generally used to examine the relationship between demography and university enrolments. The participation rate is that percentage of the 18 to 24 year old population (17 to 23 in Newfoundland and Quebec) who enrol in university or other postsecondary institutions. During the 1960s participation rates in Alberta universities grew steadily reaching a high of 15.2 percent for full-time participation in 1970. As Table 3.4 indicates, during the 1970s full-time university enrolment participation rates for the 18-24 year old population declined reaching 10.4 percent in 1979. That is, although the highest full-time enrolment in Alberta universities was recorded in 1976, the participation rate for the 18 to 24 year old population of 12.4 percent was lower than the 1970 peak of 15.2 percent. In contrast, the national participation rate for full-time university enrolment exhibits a gradual increase to 1975 and a slight decline thereafter. In the part-time university enrolment participation rates for the 18-24 year old population in Table 3.5, Alberta demonstrates a low rate by comparison with the national part-time participation rate. The part-time Alberta trend, however, has been fairly constant during the 1970s, fluctuating between 3.3 percent and 3.8 percent for the selected years.

Migration is a factor in explaining the Alberta trends. While it is clear that in-migration has inflated the 18-24 year old population, the impact of this in-migration on the university system has not had the same effect. The chief reason for migration is to seek employment, not post-secondary education.* It would appear that migrants constitute one explanation for the earlier declining full-time 18-24 year

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*The University of Alberta Data Book and University of Calgary Fact Book indicate that the non-Alberta resident portion of enrolments remained fairly constant between 1973-74 and 1979-80 while net migration to the province quadrupled.

TABLE 3.4

FULL-TIME UNIVERSITY ENROLMENT[1]
PARTICIPATION RATES 18-24 YEAR OLD POPULATION
SELECTED YEARS[2]

PROVINCE	1962	1964	1966	1968	1970	1972	1974	1975	1976	1977	1978	1979[3]
Newfoundland	4.2	5.2	7.0	7.7	9.6	10.5	8.2	8.3	8.8	8.8	7.9	8.2
Prince Edward Island	7.5	8.4	10.4	12.4	13.3	11.5	9.5	10.1	10.0	10.0	8.6	8.2
Nova Scotia	9.1	10.6	11.8	13.1	16.1	16.1	16.2	16.8	16.7	16.4	15.6	14.9
New Brunswick	8.4	9.5	10.1	11.8	13.1	12.2	12.0	12.2	11.8	11.6	11.2	10.9
Quebec	8.3	9.5	10.8	8.6	7.9	8.3	8.5	9.1	9.0	9.3	9.4	9.4
Ontario	7.0	8.1	9.4	11.4	13.2	14.0	14.8	15.3	15.4	14.6	13.8	13.2
Manitoba	8.8	9.8	12.1	13.7	14.0	13.8	13.7	14.3	13.7	13.2	12.4	11.9
Saskatchewan	8.3	10.7	11.9	13.2	13.7	12.4	12.1	12.4	12.1	11.6	11.0	10.4
Alberta	7.4	8.9	10.5	13.6	15.2	13.3	13.0	13.0	12.4	11.6	10.8	10.4
British Columbia	11.0	11.4	12.8	13.3	12.3	10.0	10.0	10.3	10.1	9.7	9.3	9.4
CANADA	8.0	9.1	10.5	11.0	11.7	11.7	11.9	12.4	12.3	11.9	11.5	11.1

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[1] Excluding non-university level programs at universities.

[2] Education in Canada (Ottawa: Statistics Canada, 1975 and 1976); Universities: Enrolment and Degrees (Ottawa: Statistics Canada, 1977 and 1978) and Advanced Statistics of Education (Ottawa: Statistics Canada, 1979-80).

[3] Participation rates for 1979 are based on Statistics Canada preliminary estimates of enrolment.

TABLE 3.5

PART-TIME UNIVERSITY ENROLMENT
PARTICIPATION RATES 18-24 YEAR OLD POPULATION
SELECTED YEARS[1]

PROVINCE	1962	1964	1966	1968	1970	1972	1974	1975	1976	1977	1978	1979[2]
Newfoundland	0.4	0.8	1.6	2.0	4.3	5.0	4.8	4.4	4.3	4.3	4.1	4.5
Prince Edward Island	2.1	2.3	3.8	3.5	8.1	6.7	5.7	6.1	5.8	5.2	5.1	4.4
Nova Scotia	1.8	1.9	2.2	2.9	3.0	3.6	5.2	5.4	5.6	5.7	5.8	5.7
New Brunswick	2.4	2.7	5.0	5.0	5.9	5.8	5.9	6.1	4.8	4.7	4.3	3.7
Quebec	3.4	4.8	5.5	5.1	8.2	6.6	6.6	7.1	7.6	8.9	9.1	9.7
Ontario	2.4	3.2	3.8	4.6	6.3	6.4	6.8	7.2	6.9	7.3	7.2	7.4
Manitoba	2.3	2.2	2.6	5.1	6.3	6.8	7.7	8.1	8.9	8.9	8.1	7.7
Saskatchewan	1.4	2.2	2.7	2.8	3.0	3.7	5.9	6.1	6.3	6.3	6.2	4.6
Alberta	1.7	2.4	2.6	3.2	3.7	3.8	3.5	3.6	3.3	3.3	3.3	3.6
British Columbia	1.5	1.5	1.6	1.8	1.5	1.6	2.6	3.0	3.2	3.4	3.7	3.8
CANADA	2.5	3.3	3.9	4.2	5.9	5.5	5.9	6.2	6.3	6.8	6.8	6.9

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[1] Education in Canada (Ottawa: Statistics Canada, 1975 and 1976); Universities: Enrolment and Degrees (Ottawa: Statistics Canada 1977 and 1978) and Advance Statistics of Education (Ottawa: Statistics Canada, 1979-80).

[2] Participation rates for 1979 are based on Statistics Canada preliminary estimates of enrolment.

old participation rates in Alberta universities. Thousands of in-migrants in the age-eligible group inflate the numbers on which participation rates are based while few enrol in provincial universities. It is possible that in-migration could have an impact on part-time participation rates. Limited studies from the Office of Institutional Planning at the University of Alberta suggest that part-time students are frequently employed full-time.

One feasible explanation for declining full-time participation rates in university education is the speculation that the growth of public colleges and technical institutes has attracted increasing numbers of students who formerly were destined for university. To determine if the decline in the university sector is a direct result of the growth in technical institutes and public colleges, it is necessaary to examine enrolments and participation rates for the total Alberta post-secondary system.

ENROLMENTS AND PARTICIPATION RATES FOR ALBERTA POSTSECONDARY INSTITUTIONS

Table 3.6 was compiled by the Office of Institutional Research at the University of Calgary. It enables comparisons in actual enrolments as well as in participation rates among universities, public colleges and technical institutes in Alberta. The figures are fall enrolments, that is, 1979 is the 1979-80 year. Athabasca University enrolments are very low (36 in 1979-80) in this table. The Alberta Statistical Review places full-time enrolments at Athabasca University at 5,200 in 1979-

TABLE 3.6 FULL-TIME ENROLMENTS IN ALBERTA POSTSECONDARY INSTITUTIONS...SELECTED YEARS

INSTITUTION	1967	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979*
UNIVERSITIES											
The University of Alberta	13 027	18 337	18 243	17 757	18 524	19 155	19 736	20 019	19 491	18 764	18 117
The University of Calgary	4 980	9 237	9 173	8 780	9 278	9 578	10 950	10 854	10 805	10 644	10 738
The University of Lethbridge	638	1 409	1 218	1 076	1 086	1 154	1 336	1 483	1 531	~~1 439~~	1 419
Athabasca University	-	-	-	-	-	-	-	-	53	82	36
TOTAL UNIVERSITIES	18 645	28 983	28 634	27 613	28 888	29 887	32 022	32 366	31 880	30 929	30 310
Percent of 18-24 Population	11.7	14.9	14.2	13.3	13.2	12.9	13.0	12.3	11.6	10.8	10.2
PUBLIC COLLEGES											
Fairview College	122	131	83	90	80	106	194	283	373	371	394
Grande Prairie Regional College	107	242	336	309	340	369	514	640	652	587	508
Grant MacEwan Community College	-	-	410	999	1 198	1 257	1 624	1 729	2 048	1 772	1 803
Keyano College	-	-	-	-	-	-	156	295	435	360	437
Lakeland College	147	160	165	142	171	184	155	389	461	579	551
Lethbridge Community College	455	843	955	990	944	960	960	1 213	1 348	1 435	1 466
Medicine Hat College	199	410	442	339	371	410	374	419	590	558	542
Mount Royal College	1 555	1 728	1 892	2 305	2 467	2 405	2 759	2 559	2 702	2 621	2 499
Olds College	271	355	403	462	512	551	505	491	665	572	638
Red Deer College	225	879	779	665	723	930	1 002	1 223	1 185	1 209	1 225
TOTAL PUBLIC COLLEGES	3 081	4 748	5 465	6 391	6 806	7 172	8 243	9 241	10 459	10 064	10 058
Percent of 18-24 Population	1.9	2.4	2.7	3.0	3.1	3.1	3.3	3.5	3.8	3.5	3.4
TECHNICAL INSTITUTES[1]											
Northern Alberta Institute of Technology	2 619	3 490	3 651	4 088	4 367	4 176	4 293	4 497	4 610	4 877	4 714
Southern Alberta Institute of Technology	2 154	2 664	2 970	3 409	3 827	3 876	4 113	4 408	4 943	5 484	5 711
TOTAL TECHNICAL INSTITUTES	4 773	6 154	6 631	7 497	8 194	8 052	8 406	8 905	9 553	10 361	10 425
Percent of 18-24 Population	3.0	3.2	3.3	3.6	3.8	3.5	3.4	3.4	3.5	3.6	3.5
TOTAL NON-UNIVERSITY SECTOR	7 854	10 502	12 096	13 798	15 000	15 224	16 649	18 146	20 012	20 425	20 483
Percent of 18-24 Population	4.9	5.6	6.0	6.6	6.9	6.6	6.7	6.9	7.3	7.1	6.9
TOTAL SYSTEM	26 499	39 885	40 730	41 411	43 888	45 111	48 671	50 512	51 892	51 354	50 848
Percent of 18-24 Population	16.6	20.5	20.1	19.9	20.1	19.5	19.7	19.3	18.9	17.9	17.0

[1] Excludes apprenticeship programs.

NOTES: (1) The rates for the university sector will differ slightly from those presented in Table 3.4 due to a slightly different statistical basis.

(2) 18-24 year old population basis for participation rates is meaningful only as a constant comparison with population.

(3) Slight discrepancies are due to rounding.

SOURCE: Data collected by The University of Calgary, Office of Institutional Research from various governmental and institutional sources.

Report #129 *Preliminary, Subject to revision.

80.[6] However, the definition of a full-time student at Athabasca University varies from that definition used by other institutions. The 1977 to 1979 count in Table 3.6 of full-time Athabasca students at 53, 82 and 36 respectively represents those students who conform to the full-time designation as defined by the three major degree-granting universities in Alberta.

The full-time enrolment peak in 1976 in Alberta universities was 32,366 with declines in subsequent years. The full-time enrolment peak in the total system was 51,892 in 1977 with slight declines in the following years. In absolute numbers, all sectors of the postsecondary system grew during the 1970s. Table 3.6 suggests that the most rapid growth period came earlier for the university system. The critical growth period for the latter was the 1960s. For example, between 1967 and 1970 full-time university enrolment increased 55 percent while non-university full-time enrolment grew 39 percent. The non-university sector grew during the 1970s when there was also a parallel growth in the 18-24 year old population in Alberta.

A major question remains to be answered. That is, are the declining full-time participation rates in universities a direct result of increasing participation rates in the remainder of the postsecondary system? Based on the participation rate for the total postsecondary system, no such simple explanation exists. In 1970, 20.5 percent of the 18-24 year old population were taking some kind of full-time postsecondary training. However, only 17.0 percent were doing so in 1979.

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[6] Alberta Treasury, Bureau of Statistics, Alberta Statistical Review, 75th Anniversary Edition, Nov., 1980, p. 38.

That is, a smaller percentage of the age-eligible population were opting for postsecondary education in 1979 than in 1970.

The most recent data are noteworthy. From 1977-78 to 1979-80 the non-university sector experienced an increase in absolute numbers of 471* students. During the same period, the university sector lost 1,570 students, more than three times the number gained in the non-university sector. Participation rates in both sectors declined from 1977 to 1979 although the non-university sector had only a slight decline. It appears that students are not simply shifting from one part of the postsecondary system to another.

An additional way of arguing that the university sector participation rate decline is a direct result of the increase in the non-university sector would be to examine the number of high school matriculants and university graduates who enrol in the non-university sector. However, public colleges and technical institutes do not collect data on the proportion of their enrolment who are graduates of or who qualify for university (matriculants). If such data were available, a large growth in the number of matriculants and university graduates enrolling in non-university institutions would suggest that the decline in the university participation rate is a direct result of the growth of the non-university sector.

In general, the data on enrolments and participation rates support the following proposition from the world systems model:

1. That during the expansion period in the world capitalist system Alberta's peripheral position to a central Canadian core would

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*Preliminary. Subject to revision.

suggest economic as well as cultural dominance including:

a) General Canadian economic growth producing similar patterns of supply and demand for university educated manpower across Canada.
b) Highest demand in the more developed core producing the "brain drain" phenomenon from Alberta to central Canada.
c) Cultural dominance in which periphery accepts prevailing core rationale for higher educational expansion.

University participation in Alberta tended to follow national trends during the growth period of the 1960s. Alberta shared general Canadian optimism about the economic potential of the country and the ability of the labor market to absorb increasing numbers of university graduates. By 1970, Alberta had the second highest, full-time university enrolment participation rate in Canada. Although more information would be required to substantiate the "brain drain" hypothesis, a healthy central manufacturing core and general economic growth helped to foster a rationale for higher educational expansion that touched all regions of Canada.

PARTICIPATION RATES AS A PERCENTAGE OF ALBERTA HIGH SCHOOL GRADUATES

One explanation for the declining participation rate in post-secondary education is the fact that 21 percent of the total net in-migration (mainly job seekers) in a given year in Alberta are 18 to 24 year olds. Perhaps a suitable alternate indicator of trends in university patterns of enrolment in Alberta where in-migration is high would be to base participation rates on Grade 12 Alberta students from the previous year. Relevant data would include the number of grade 12 students, the number of matriculants and freshman enrolment in the subsequent year. Thus, the participation rate would be based on a smaller cohort.

In Table 3.7 the participation rate is the number of full-time freshmen as a percentage of the previous year Alberta grade 12 students.

TABLE 3.7

FULL-TIME FRESHMEN[1]
ALBERTA UNIVERSITIES PARTICIPATION RATE
BASED ON ALBERTA GRADE 12

YEAR	TOTAL FRESHMEN[2]	ALBERTA GRADE 12 (PREVIOUS YEAR)	PARTICIPATION RATE
1970	5 987	27 138	22.1
1971	5 445	28 793	18.9
1972	4 909	30 009	16.4
1973	5 535	29 599	18.7
1974	5 719	29 676	19.3
1975	6 034	29 438	20.5
1976	5 222	30 920	16.9
1977	4 779	31 029	15.4
1978	4 640	31 681	14.6
1979	4 606	32 124	14.3

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[1] Office of Institutional Research, The University of Calgary based on data supplied by Alberta Education. Report 129, p. 9.

[2] Freshmen are defined as students who have not previously attended any postsecondary institution.

The participation rate for this smaller cohort follows a pattern similar to the 18-24 year old participation rate during the past decade. With the exception of the temporary gain in 1974 and 1975, there is a general declining trend. In contrast to this trend, participation of 17 year olds in Grade 12 remained relatively constant (82 percent between 1975 and 1979-80[7]). Figure 3.5 provides a comparison of the

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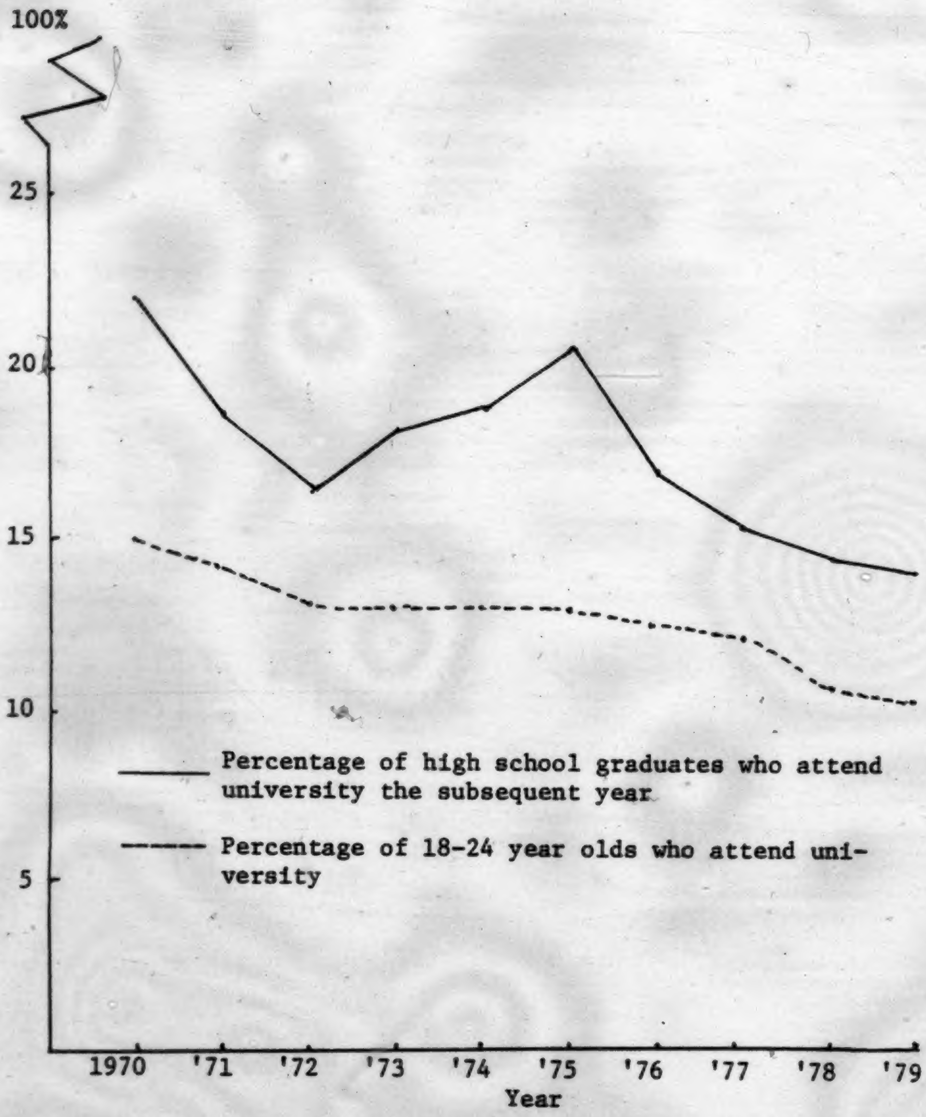
[7] Report 129, p. 9.

FIGURE 3.5

ALBERTA FULL-TIME PARTICIPATION RATES FOR THE 18-24 YEAR OLD POPULATION AND HIGH SCHOOL GRADUATES CONTINUING ON TO UNIVERSITY



Based on Tables 3.4 and 3.7.

participation rates of the two groups, the Albertan 18-24 year olds and high school graduates.

A more select cohort within the Grade 12 population would be that proportion of students who qualify for university entrance, matriculants. While the number of matriculants has remained comparatively stable over the past few years, Table 3.8 indicates that after 1974 the full-time freshmen participation rate (freshmen as a percent of grade 12 _matriculants_) has declined from 54.9 percent in 1974 to 39.1 percent in 1979.

The attempt has been to control the effect of job-seeking in-migrants on the full-time, university enrolment participation rates for the 18-24 year old population. It appears, however, that there is also a decline in freshmen participation rates as a percentage of both the general Alberta Grade 12 graduates and the more select group of matriculants from the previous year. Net in-migration is only one factor in changing participation rates. Alberta Grade 12 matriculants were not as likely to enrol as freshmen in 1979 as they were earlier in the decade. A full explanation of this trend cannot be gleaned from the data. To reiterate, more information on the destination of the matriculants who are _not_ enrolling at university would be useful. Are they entering the labor force directly out of high school or are they enrolling in other postsecondary institutions? Are more students delaying entry to university while they obtain some work or travel experience? There is some evidence to support the latter view. The Office of Institutional Research and Planning at the University of Alberta reported in "Some

TABLE 3.8

ALBERTA UNIVERSITIES FULL-TIME FRESHMEN[1] PARTICIPATION RATE

YEAR	ALBERTA GRADE 12 PREVIOUS YEAR TOTAL	ALBERTA GRADE 12 PREVIOUS YEAR MATRICULANTS	MATRICULANTS AS A RESULT OF TOTAL GRADE 12	TOTAL FRESHMEN	FRESHMEN AS A PERCENT OF GRADE 12 MATRICULANTS
1973	29 599	11 172	37.7	5 535	49.5
1974	29 676	10 422	35.1	5 719	54.9
1975	29 438	11 475	39.0	6 034	52.6
1976	30 920	11 493	37.2	5 222	45.4
1977	31 029	11 927	38.4	4 779	40.1
1978	31 681	11 689	36.9	4 640	39.7
1979	32 124	11 781	36.7	4 606	39.1

Source: Office of Institutional Research, The University of Calgary based on data supplied by Alberta Education. Report 129, p. 10.

General Characteristics of 1979-80 Full-time Undergraduate Students at the University of Alberta" that approximately one-quarter of respondents had neither been in university nor secondary school the previous year. All of the aforementioned factors are potential explanations for the changing trends in university enrolment patterns. There is no indication of a direct transfer from one postsecondary institution to another although it is likely that some students have followed this route.

It is evident that, in spite of the enviable provincial economic position, participation rates and, later, actual enrolments in Alberta universities started to decline during the last decade. This is one expectation from the world systems model which lacks support:

> 6. That participation rates and actual enrolments in Alberta universities have and will continue to grow because of available job opportunities and higher relative incomes for professionals.

However, the over-riding proposition of cultural dominance (tenet 10 from the model) may well explain this anomaly. Based on only partial data, the Alberta labor market should be able to absorb a higher ratio of university graduates than most other provinces in Canada. Why, then, have university supply trends followed a downward path more pronounced than the average Canadian trend? One explanation put forth is the earlier entry of Alberta youth into the labor market. A second explanation would be the cultural dominance of the central Canadian core. A commonly expressed attitude, reinforced by national publicity often emanating from Toronto, is that university graduates from many disciplines are experiencing difficulty in obtaining suitable employment in Canada. While potential university students in Alberta appear to be responding to this publicity, it is very questionable that the problem would apply to this province, at least to the same extent that it would in other provinces.

After first projecting enrolment trends in Alberta universities, an examination of the changes in participation by age, sex and discipline may reveal more information on the changing choices of potential and actual university enrolees.

PROJECTED FULL-TIME ENROLMENT IN ALBERTA UNIVERSITIES

The demographic trends that have been analyzed in this chapter are important for anticipating future potential patterns of enrolment. It is not as simple to forecast university enrolments as it is to project school age enrolments of students who fall within the compulsory school-age limit. Although other factors enter the picture, demography has, nonetheless, influenced university enrolments in the past and is likely to continue to do so in the future.

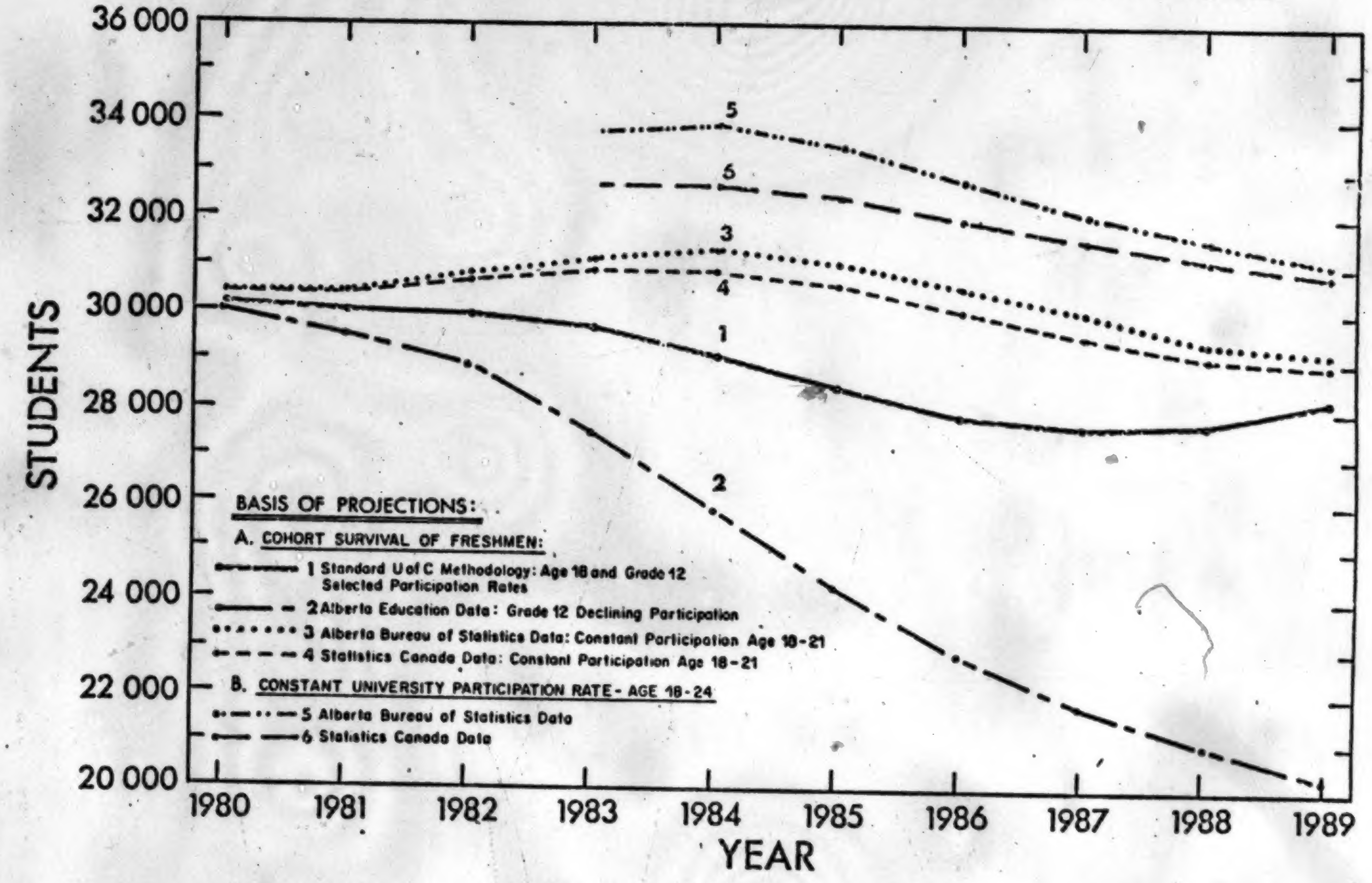
The most thorough study of Alberta university enrolment trends made public to date has come from the Office of Institutional Research (OIR) at the University of Calgary. The analysis here employed is drawn from the OIR, Report 129. Figure 3.6 provides an interesting comparison of the 1980 decade projections which use standard methodologies and which are drawn from various sources. Depending on the source of data and particularly on the assumptions used in the projection, there are wide discrepancies in the Alberta full-time enrolment projections. Some of the underlying assumptions include: a constant (current) university participation rate for the 18-24 year old population applied to Statistics Canada population projections; constant participation of the younger 18-21 age cohort; a more select Grade 12 cohort for projecting freshmen enrolment; finally, projections based on the select Grade 12 group but using a participation rate decline equal to the rate of decline that occurred during the 1970 decade.

The projections in Figure 3.6 are described in two categories, central and limiting cases. The central cases, projections 1, 3 and 4, show a more stable or flatter trend from 1980 to 1989. The Alberta Bureau of Statistics and Statistics Canada projections of the 18-21 population cohort are used in projections 3 and 4. The assumption is that population and participation rate changes will not be immediately reflected in total university enrolment at least not with the magnitude reflected in projections 5 and 6. Projection 1, adopted by the University of Calgary, is the freshmen enrolment derived by averaging different projections using Alberta Grade 12 and the 18 year old cohort. Projection 1 at its lowest point is only 8.7 percent below the actual university enrolment of 30,310 in the fall of 1979. These central cases present a more stable trend than the waves of population in Figure 3.4 (The Class of 2001) would suggest.

The limiting cases, projections 2, 5 and 6, are the "best" and "worst" cases. The best cases are 5 and 6 which are calculated by applying the current 18-24 year old participation rate to population projections supplied by the Alberta Bureau of Statistics and by Statistics Canada. The latter begin in 1983 in order to eliminate the short-term

FIGURE 3.6

PROJECTED FULL-TIME ENROLMENT, ALBERTA UNIVERSITIES



Source: Office of Institutional Research, University of Calgary, Report 129, p. 12.

effect of students already in the system. These best cases reflect the long range population trends, current participation rates and anticipate that potential enrolments during the 1980 decade will be consistently higher than the 1979 figure.

Projection 2 is the worst case and is the method favored by Alberta Advanced Education and Manpower. It is calculated on the assumption that the Grade 12 cohort freshman participation rate will continue to decline at the same rate it did during the 1970 decade. Successively smaller freshman classes will result. The impact of declining freshman enrolment is only felt in 1983 when the three classes already in the system have graduated and the decline accelerates.

Depending on the assumptions one wishes to accept, by the end of the 1980 decade full-time enrolment in Alberta universities is projected to be either a low of 20,300 students or a high of 31,100 students. The latter figure is close to the fall 1979 enrolment of 30,310 and would tend to demand less institutional adaptation. On the other hand, if during this decade the universities were to experience enrolment declines of 10,000 students, it is likely that problems within the system would be extreme. Staffing and budgeting present particular headaches. The tenure system, coupled with highly specialized areas of expertise, produce inflexible staffing arrangements. Moreover, education costs do not rise and fall with enrolment. When enrolment declines, a program is not necessarily less expensive to run. Most frequently, per student costs rise as enrolments decline, class size diminishes and an aging, tenured staff reach the top wage levels. The physical plants themselves require maintenance and cannot contract and expand with enrolments.

The pessimistic projection (2) parallels the opinions of Advanced Education and Manpower's Planning Secretariat in Demographic and Manpower Trends in Alberta: Possible Impact on the Advanced Education System 1971-1988 (May, 1980). The forecasts used in the latter document indicate a stabilization of full-time enrolments during the 1980s at the postsecondary system level.

> However, while full-time enrolments may stabilize at the system level, the proportion of full-time enrolments in the Public College and Technical Institution sectors are expected to continue to increase relative to the University Sector.[8]

The large growth in part-time and apprenticeship programs in the Public College and Technical Institute sectors is expected to continue. The speculation voiced by the Planning Secretariat (by imputing motives to those who choose to or not to participate) is that students are selecting programs which are more employment-related than university programs are. Whether or not matriculants are inflating the number of part-time and apprenticeship program students is a moot point. In the past, apprenticeship programs have been mainly the destination of students who failed to qualify for entrance to university. Moreover, the full-time enrolments in Table 3.6 exclude apprenticeship programs since they are frequently not defined as postsecondary education.

SEX AND AGE DISTRIBUTION IN ENROLMENTS

Along with changes in participation rates over the past decade have come changes in the characteristics of persons participating in postsecondary education. To appreciate changes that may be unique to the university, some information on the total postsecondary system is also included in this section as a basis for comparison.

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[8] Planning Secretariat, Advanced Education and Manpower, Demographic and Manpower Trends..., p. ii.

During the past decade there has been a general increase in the proportion of females in full-time university enrolment in Alberta. Between 1970 and 1979, male full-time enrolment declined by 1723 students. In the same time period, female enrolment increased from 10,937 to 13,910, a gain of 2973 female students. Table 3.9 presents a breakdown of enrolment by sex at the three major universities in Alberta. From 1970 to 1976 male enrolments remained fairly stable while female enrolments increased steadily. After 1976-77, male enrolment began to decline and there was an attendant stabilization in female enrolment. The data suggest that the declining Alberta participation rate in university over the 1970s was a matter of declining male participation.

It would appear that this changing proportion of male to female full-time enrolment is peculiar to the university sector. As Table 3.10 indicates, the percentage distribution of full-time enrolments by sex has fluctuated very little in the Public College and Technical Institution Sectors of the postsecondary system during the 1970s. However, while females constituted 37.37 percent of the university full-time enrolment in 1971-72, they made up 44.94 percent of full-time university enrolment by 1978-79. The public college sector has been consistently and predominantly attended by more females while the reverse is true of the technical institutes. In the latter, the male to female ratio (66:34) of full-time enrolments has been fairly stable. Only the universities appear to be moving in the direction of a more equal sex

TABLE 3.9

ALBERTA FULL-TIME WINTER SESSION UNIVERSITY STUDENTS BY SEX

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
U. of Alberta										
Male	11,355	11,386	11,038	11,283	11,446	11,613	11,453	10,890	10,234	9,666
Female	6,981	6,851	6,700	7,224	7,693	8,102	8,538	8,574	8,507	8,409
U. of Calgary[1]										
Male	5,884	5,828	5,514	5,665	5,713	6,483	6,221	6,151	6,032	6,005
Female	3,353	3,345	3,266	3,613	3,865	4,467	4,643	4,654	4,612	4,733
U. of Lethbridge [2]										
Male	806	716	654	660	640	709	754	757	699	651
Female	603	502	422	426	514	631	720	774	740	768
Total Universities[3]										
Male	18,045	17,930	17,206	17,608	17,799	18,805	18,428	17,798	16,965	16,322
Female	10,937	10,698	10,388	11,263	12,072	13,200	13,901	14,002	13,858	13,910
Total	28,982	28,628	27,594	28,871	29,871	32,005	32,329	31,800	30,823	30,232

[1] Starting 1973-74, U. of Calgary enrolments are fall enrolments, i.e. fall, 1973.

[2] Lethbridge enrolments are fall enrolments.

[3] Enrolments may differ slightly from Table 3.6 due to a different data source.

Source: Offices of Institutional Research, U. of Alberta Data Book 1979-80, U. of Calgary Fact Book, 1979-80.
Office of the Registrar, University of Lethbridge Statistics, Volumes 1970/71 to 1979/80 inclusive.

TABLE 3.10

PERCENTAGE DISTRIBUTION OF FULL-TIME ENROLMENTS BY SEX AND SECTOR, ALBERTA, 1971/72 to 1978/79

Year	University Sector	Public College Sector	Technical Institution Sector	Total AAEM System
Male				
1971/72	62.63	35.50	65.98	65.95
1972/73	62.37	36.15	66.01	66.06
1973/74	60.99	36.16	66.02	65.58
1974/75	59.59	36.14	66.00	62.86
1975/76	58.76	36.14	66.01	61.92
1976/77	57.00	36.80	65.99	61.49
1977/78	55.97	36.71	66.02	61.35
1978/79	55.09	36.15	66.00	60.90
Female				
1971/72	37.37	63.50	34.02	34.04
1972/73	37.63	63.85	33.99	33.93
1973/74	39.01	63.84	33.98	34.41
1974/75	40.41	63.86	34.00	37.13
1975/76	41.24	63.86	33.99	38.07
1976/77	43.00	63.20	34.01	38.50
1977/78	44.03	63.29	33.98	38.64
1978/79	44.94	63.85	34.00	39.09

Note: Age and Sex data for Public Colleges and Technical Institutions are estimated and may be revised.

Source: Prepared by the Planning Secretariat, Alberta Advanced Education and Manpower, November, 1979.

Demographic and Manpower Trends in Alberta... May, 1980, p. 37.

distribution in full-time enrolments. Thus, increasing university participation by females is supportive of half of the world systems proposition number seven:

> 7. That gains in access to universities will continue to be made by females and lower classes as enrolments grow.

Females formed an increasing percentage of the university population over the 1970 decade. This is predictable in light of the rising participation of women in the labor force. The world systems explanation is that the women's movement is both a cultural spin-off from the U.S. as well as a class based phenomenon. The greater presence of women in universities is one indication that the economic position of women in society may be improving. No analysis by class is attempted. It is reasonable to speculate that since university enrolments dipped during the latter part of the 1970s, and student interests shifted to more professional and business programs (historically the enclave of the established or capitalist class) that decreases in enrolments represent declines from the lower end of the economic ladder.

Age is another characteristic which is showing some change in trend among full-time university students. It would appear from Table 3.11 that fewer students in the 17-20 year age category were in full-time enrolment in 1978-79 when compared to 1971-72. This age change is apparent throughout the total postsecondary system although the decline in females over time in this young age category is particularly noticeable in full-time university enrolments. On the other hand, there has been a total system increase in the number of students aged 21 to 29 in full-time enrolment. Again, this increase is great-

TABLE 3.11

PERCENTAGE DISTRIBUTION OF FULL-TIME ENROLMENTS
BY SEX AND SELECTED AGE GROUPS
ALBERTA, 1971/72 to 1978/79

		University Sector		Public College Sector		Technical Institution Sector		Alberta Advanced Education & Manpower System	
Age Group	Year	Male	Female	Male	Female	Male	Female	Male	Female
17-20 Yrs.	1971/72	39.0	57.7	66.0	66.7	56.8	56.8	44.3	59.5
	1978/79	36.4	43.8	58.9	61.8	56.2	56.2	44.0	50.4
	Change	-2.6	-13.9	-7.1	-4.9	-0.6	-0.6	-0.3	-9.1
21-24 Yrs.	1971/72	35.9	26.7	19.9	20.1	27.5	27.6	33.1	25.4
	1978/79	38.5	34.6	23.2	23.3	27.6	27.6	33.9	30.6
	Change	2.6	7.9	3.3	3.2	0.1	0.0	0.8	5.2
25-29 Yrs.	1971/72	16.6	6.8	9.5	3.8	9.8	9.8	14.8	6.6
	1978/79	17.4	11.5	12.7	5.2	10.1	10.1	15.1	9.6
	Change	0.8	4.7	3.2	1.4	0.3	0.3	0.3	3.0
30-34 Yrs.	1971/72	5.1	3.2	1.7	1.7	2.9	2.9	4.5	2.8
	1978/79	4.9	4.7	2.5	2.6	3.0	3.0	4.2	3.9
	Change	-0.2	1.5	0.8	0.9	0.1	0.1	-0.3	1.1
35 Yrs. and Over	1971/72	3.4	5.5	3.0	7.7	2.9	2.9	3.3	5.6
	1978/79	2.8	5.4	2.6	7.0	3.1	3.1	2.8	5.5
	Change	-0.6	-0.1	-0.4	-0.7	0.2	0.2	-0.5	-0.1

Note: Age and Sex data for Public Colleges and Technical Institutions based on estimates and may be revised.

Source: Prepared by the Planning Secretariat, Alberta Advanced Education and Manpower, November, 1979.

Demographic and Manpower Trends in Alberta...May, 1980, p. 38.

est among females in full-time university attendance.

What do these sex and age trends suggest? The greater participation of females in university education is consistent with general societal changes. There has been a shift from more traditional female roles to greater labor force participation by females. The fact that the male to female ratio changes are more apparent in the university sector of the postsecondary system suggests that over the past few years fewer males have selected the university route. Some may be entering the labor force directly out of high school as job opportunities have expanded during the economic boom in Alberta. It may well be that entry into and length of stay in university is in part a reflection of a lack of job opportunities. That is, students who seek employment unsuccessfully may enter university as a second choice. On graduation, a lack of suitable employment often encourages students to seek post-graduate training which may enhance their marketability.

Females, on the other hand, have been traditionally under-represented in highly qualified occupations and are now moving into this area. It may be that the non-skilled or semi-skilled employment available to young males, such as construction and oil rig labor currently in high demand in Alberta, is not equally available to females for various reasons. Thus, females are not offered the same post-high school, adequately paid employment. University may be perceived as the route to well-paid employment for females.

It is also apparent that relatively more full-time students in the 21-29 age bracket were attending university in 1978-79 than in

1971-72 with a concomitant decline in the 20 years and under group. This suggests that there is an increasing tendency for students to defer their entry to university. The implications of this aging trend are far reaching. First, the former practice of basing participation rates on particular age groups, most frequently 18-24, may have to be altered. The shift to more 25 to 29 year olds and the concurrent decline in the 17 to 20 group may subsequently necessitate a different age group base on which to calculate full-time university participation rates. Second, the practice of basing full-time participation rates on the previous year's Grade 12 cohort may also prove less than desirable. If more students are deferring entry to university, declining freshmen participation rates as a percentage of the previous Grade 12 cohort may only verify that fewer high school graduates are going directly to university. This does not mean that they will not enter at a later date. Third, the Alberta Education projection 2 in Figure 3.6 (the "worst" case) is based on Grade 12 declining participation in full-time university enrolment which shows an acceleration over the decade. Such a projection would tend to greatly underestimate potential enrolment since the assumption behind the projection appears to be that high school graduates who do not become full-time university students in the subsequent year have been lost to the system forever. Of course, other non-demographic factors also make this projection questionable. The social, political and economic climate which spawns a trend may abruptly alter, causing a trend reversal. Research on supply and demand demonstrates the cyclical nature of this field. An over-supply of highly qualified manpower entering the labor force in a concentrated period of time may be followed by an undersupply. One could speculate that (following projection 2) as fewer and fewer graduates enter the labor market in the 1980s, demand for university graduates may increase. If the population is aware of demand, an upward trend in full-time enrolment is likely to ensue (given the economic "law" that most people tend to act in their own best interests). Although highly speculative, the latter comments are designed to illustrate the dangers of projecting a trend by accelerating one aspect of it. Declining participation by one segment of a population does not necessarily produce enrolment declines, particularly declines of extreme magnitude.

It may be that aging trends in university enrolments are an indication of a move to more "lifelong" learning. If the trend continues, it will to a certain extent mitigate the drop in enrolment anticipated after the 1983 peak in the 18 to 24 year old population. The crest of the population wave will then be swelling the 25 to 29 year old age group. Increasing participation from this burgeoning group would tend to offset the anticipated enrolment decline precipitated by maturing baby boom children.

If, as some research suggests, economic conditions are also a factor in enrolments, a lull in the megaproject construction boom in Alberta would leave many unskilled and semi-skilled workers unemployed. Matriculants who are counted among the latter may subsequently seek university training to improve their marketability. This occurrence would further augment the aging enrolment trend and once more illustrates the desirability of re-assessing the age cohort methodologies for determining university participation rates.

CHANGING DISCIPLINE CHOICES

Along with changing characteristics of the student population have come changes in the choice of discipline or degree sought by students who are enrolled full-time. From an historical view, discipline or faculty selection has tended to fluctuate over time with some disciplines subject to more cyclical changes while others are inclined to grow at a slow and steady pace. In this section the student choices of the 1970s are contrasted with those of the preceeding fifteen-year period.

During the expansion period for Alberta universities, the rapid enrolment increase was not equally distributed among faculties. In fact, Table 3.12 suggests that while the Arts/Science (combined) and the Education Faculties grew ninefold between 1955-56 and 1969-70, Medicine enrolments did not quite double and Law enrolments merely tripled. Business Administration and Commerce registered twelve times as many students in 1969-70 as in 1955-56. By far the largest increases were recorded in Graduate Studies and Research. The trend to increasing levels of education was reflected in the fact that 107 graduate students in 1955-56 had mushroomed to over three thousand by 1969-70, twenty-eight times the former enrolment.

It should be stressed that professional faculty enrolments do not realistically represent student "choices." Law and Medicine have historically limited admissions to their respective faculties and the consistent but small growth more than likely reflects this admissions policy. Statistics on the number of applicants to these faculties would be a more accurate indicator of changing student choices. Re-

TABLE 3.12

FULL-TIME ALBERTA UNIVERSITY-LEVEL STUDENTS BY SELECTED FACULTY FOR SELECTED YEARS, 1955-56 to 1969-70

	1955-56	1961-62	1963-64	1965-66	1967-68	1969-70	% change (6 ÷ 1)
Arts-Science	1047	2562	3446	4823	6801	9482	906
Business Administration and Commerce	142	399	685	879	1182	1774	1249
Education[1]	735	2493	3294	4173	5180	6901	939
Engineering[2]	913	1066	933	1129	1592	2028	222
Graduate Studies and Research	107	471	825	1304	1924	3012	2815
Law	86	130	124	172	228	307	357
Medicine	216	259	267	315	385	417	193

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[1] Undergraduate enrolment from 1962-63 includes students preparing for first degrees or diplomas (i.e. first professional qualifications) after a prior degree in another field. Students with a prior degree or equivalent diploma in the same field are reported as graduate.

[2] Engineering and Applied Science

Source: Dominion Bureau of Statistics, Education Division, Survey of Higher Education, 1962-63, 1967-68, 1969-70. University-level enrolments include some college enrolments beyond senior matriculation. DBS did not segregate by institution prior to 1969-70.

cords from the Registrar's Office at the University of Alberta (the only source of graduates in these disciplines during that period) indicate that during the period in question applications for admission to Law and Medicine did not increase at the same rate as demand for places in Graduate Studies and Research, Arts/Science and Education. That is, between 1955-56 and 1969-70, there was a comparatively modest increase in demand for places in the professional faculties of Law and Medicine.

The Faculty of Engineering is a unique case. Enrolments were already large in 1955-56, at least they were large relative to any other single, specialized field. In terms of a growth ratio, the enrolment in the fifteen year interval merely doubled, much like the Faculty of Medicine. However, until recently, admission restrictions were not characteristic of the Engineering Faculty. Modest growth can thus be accounted for on two bases. First, enrolments were already large during the 1950s, indicating an earlier growth spurt, second, student demand for this area of study did not increase during this period at the same swift rate as it did for other faculties. Some research suggests that Engineering enrolments have historically been more predictable than other university faculty enrolments. Richard Freeman identified a classic "cobweb" cycle of engineering enrolment.[9] He linked freshman Engineering enrolments to labor market surpluses or shortages, with high freshman enrolments associated with labor market shortages for engineers. Subsequent surpluses occur after a four year lag as this large freshman cohort enters the labor market and depresses demand, which again is associated with lower freshman enrolments in the subsequent year. It is not possible to determine if such a cobweb pattern is observable since Table 3.12 presents total faculty not freshman enrolments. In the following chapter, the link between freshman enrolments and labor market demand will be specified.

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[9] Richard B. Freeman, The Over-Educated American (New York: Academic Press, 1976), pp. 112-

During the 1970s different patterns of enrolment emerged. In general, the university boom stopped by 1970 and although there was a smaller growth spurt in the mid-seventies, the enrolment pattern was moderately stable with declines toward the end of the decade in many faculties. In particular, it was the faculties which experienced the fastest growth during the 1955 to 1970 period which tended to decrease during the seventies. As Table 3.13 and Figure 3.7 indicate, Graduate Studies and Research, Education and the combined Arts and Science enrolments experienced an absolute decline from 1970 to 1979. The most abrupt decline was registered in the Education Faculty during the last three years of the decade with a loss of 2296 full-time undergraduate Education students in Alberta universities.

Business Administration and Commerce had large increases in enrolment during the first half of the 1970 decade with declines during the second half. The declines are likely to be overstated, however, since students in the first year of Management at the University of Calgary began registering in University College in the fall of 1977. Management students were to continue in University College for their second year. The Management school showed a subsequent decline while there was an attendant increase in University College from 1977 on. Declines

FIGURE 3.7

HISTORICAL FULL-TIME ENROLMENTS IN ALBERTA UNIVERSITIES FOR SELECTED FACULTIES AND SELECTED YEARS BETWEEN 1955-56 AND 1979-80

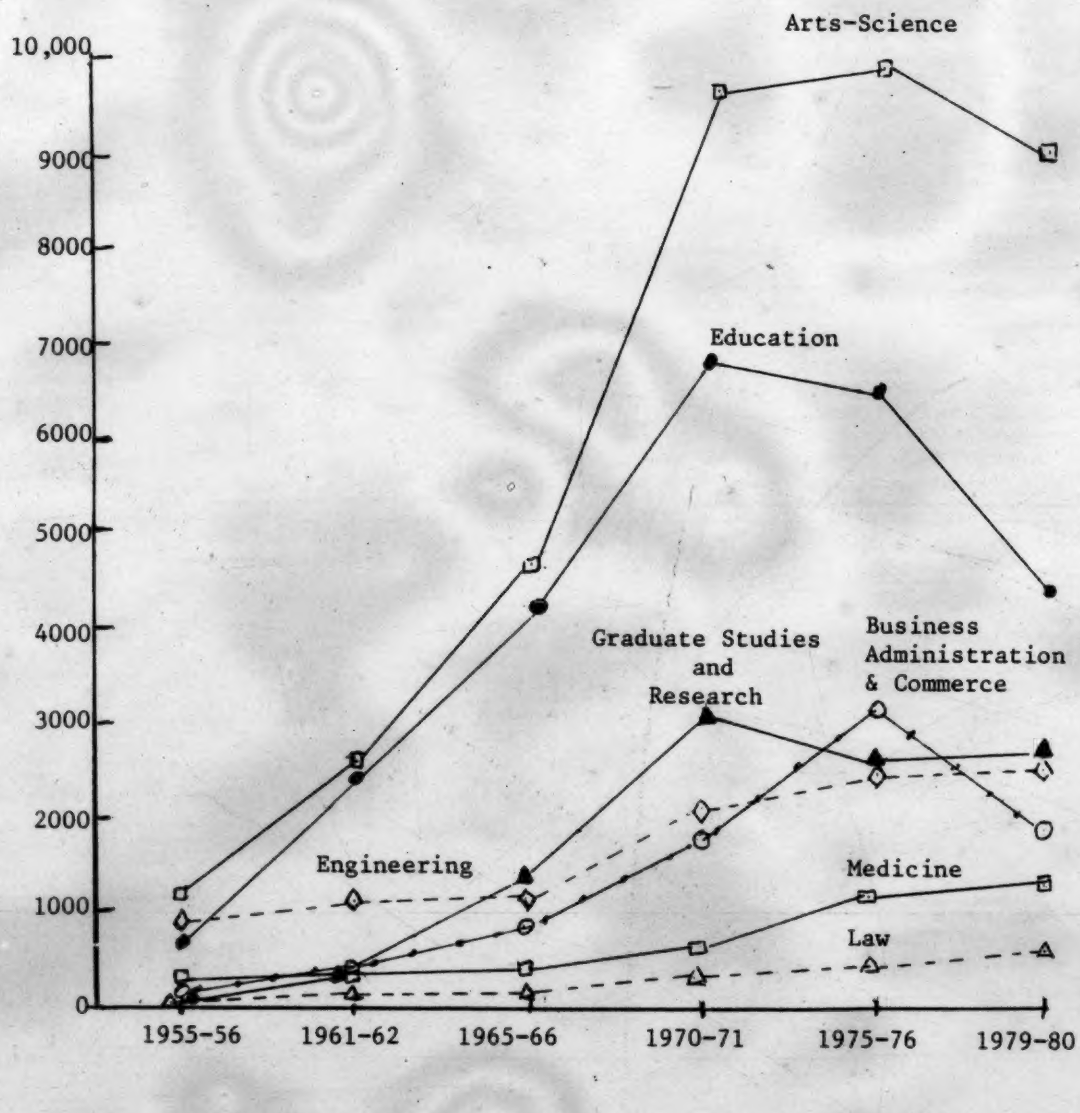

TABLE 3.13

FULL-TIME STUDENTS BY DEGREE SOUGHT FOR SELECTED FACULTIES, 1970-71 TO 1979-80

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
ARTS-SCIENCE										
Alberta	5921	5842	5731	5881	5936	5821	5773	5647	5718	5646
Calgary [2]	2874	2904	2828	3201	3220	3289	3055	2857	2555	2397
Lethbridge	905	785	729	765	771	873	932	1031	975	960
Total	9700	9531	9288	9847	9931	9983	9760	9535	9248	9003
BUSINESS ADMINISTRATION AND COMMERCE[3]										
Alberta	1118	1293	1400	1568	1774	1833	1765	1533	1382	1286
Calgary[1]	680	716	773	861	958	1206	1150	850	625	624
Lethbridge	-	-	-		-	-	-	-	-	-
	1798	2009	2173	2429	2732	3039	2915	2383	2007	1910
EDUCATION										
Alberta	4236	3972	3392	3518	3676	4070	4200	4031	3567	3126
Calgary[1]	2230	2096	1881	1755	1820	2094	2021	1468	1049	882
Lethbridge	504	433	347	321	383	467	542	500	464	459
Total	6970	6501	5620	5594	5879	6631	6763	5999	5080	4467
ENGINEERING										
Alberta	1380	1238	1140	1167	1280	1469	1588	1620	1658	1606
Calgary	654	601	571	582	699	1003	885	1024	1076	1092
Lethbridge	-	-	-	-	-	-	-	-	-	-
	2034	1839	1711	1749	1979	2472	2473	2644	2734	2698
GRADUATE STUDIES AND RESEARCH										
Alberta	2157	2085	1985	1850	1834	1891	2040	2003	1984	1899
Calgary	850	819	754	683	704	780	785	779	770	770
Lethbridge	-	-	-	-	-	-	-	-	-	-
	3007	2904	2739	2533	2538	2671	2825	2782	2754	2669

TABLE 3.13 (Cont'd.)

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
LAW										
Alberta	366	420	471	490	472	484	476	503	487	497
Calgary	-	-	-	-	-	-	61	111	169	178
Lethbridge	-	-	-	-	-	-	-	-	-	-
	366	420	471	490	472	484	537	614	656	675
MEDICINE										
Alberta	677	746	755	799	812	846	864	878	861	883
Calgary	78	123	207	274	301	338	358	386	407	446
Lethbridge	-	-	-	-	-	-	-	-	-	-
	755	869	962	1073	1113	1184	1222	1264	1268	1329

[1] Beginning 1977-78, U. of Calgary students intending to transfer to the Faculties of Education and Management register in University College for their first year. Management students continue in University College for their second year. University College enrolment was 3811 in 1979-80, 3422 of whom were unspecified degree students.

[2] Effective 1976, April 1, the Faculty of Arts and Science at the U. of Calgary was divided into three separate Faculties and University College. The numbers represent students registered in majors offered by the Faculties and College.

[3] Management Faculty at the U. of Calgary. Likely to be understated for reasons stated in footnote 1.

Source: Offices of Institutional Research, U. of Alberta Data Book 1979-80, U. of Calgary Fact Book, 1979-80.
Office of the Registrar, University of Lethbridge Statistics, Volumes 1970/71 to 1979/80 inclusive.

at the University of Alberta were recorded, however, and reflect the fact that the Faculty began imposing quotas by this time. Current enrolment data, then, are not an accurate measure of student interest in this field. For example, while enrolments at decade end were declining, only 48 percent of Alberta applicants who met minimum requirements for entrance to the first year of Business Administration and Commerce at the University of Alberta in 1979-80 were admitted.[10]

Among the other quota faculties, Medicine and Law continued to grow at a rate which has remained remarkably consistent during the past twenty-five years. However, both deans and the Registrar's office at the University of Alberta suggest that interest in these faculties, by the number of applications, has increased during the past decade. In 1979-80, the Faculty of Law admitted only 36 percent of Alberta residents who met minimum requirements* and Medicine admitted only 35 percent. Very few applicants to these faculties from non-Alberta residents were admitted during the same year.[11]

Engineering enrolments demonstrated modest increases over the ten year period. However, by 1976-77, a greater demand for places resulted in the introduction of a quota system at the University of Alberta and undergraduate enrolment at this institution was more stable thereafter. Again, the engineering enrolment does not currently reflect student choice. According to the February, 1981 issue of "Folio: New Trail," there was a very steep increase in applications to Engineering during the 1970 decade at the largest Engineering Faculty, the University of Alberta.

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[10] U. of Alberta, Data Book 1979-80, p. 14.

[11] Ibid.

*Minimum requirements are defined as a 6.5 average over the last two years of undergraduate study.

In summary, the changing student discipline choices are better understood from a long term perspective of twenty-five years. The majority of the faculties which grew the fastest during the pre-1970 period were also the faculties which declined during the 1970s. In addition, however, there has been a large increase in the number of quota faculties in comparison to a decade earlier. Basically, this means that students who meet minimum requirements are being turned away from faculties of their choice. Where do these students go? Quite possibly some enter alternate faculties. It is also possible that some proceed to the labor market perhaps attempting to upgrade averages or re-apply to the faculty of their choice at a later date. This would provide one explanation for the "aging" student enrolment and the increasing tendency to defer entry to university. It would also provide one possible explanation for the general, temporary* dip in enrolments during the last three years of the 1970s when more rigid quotas came into effect.

It is apparent that, with the exception of the Education Faculty, there is increased interest in those faculties which provide specific vocational preparation rather than a general education. The quota faculties are mainly specific vocational and professional faculties.

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*Preliminary, unpublished data from 1980-81 and 1981-82 indicate an upturn in the total enrolment of Alberta universities. Concurrently some high demand faculties, such as Engineering and Business, are expanding. Lethbridge has added a School of Commerce and Alberta has a new Ph.D. program in Management.

Some authors suggest that labor market opportunities tend to influence student discipline choice. However, there is a dearth of research in this field which would provide conclusive evidence of the degree to which opportunities in certain occupations attract students into these university disciplines. Many do speculate, nonetheless, on the apparent association between the two. Writers have particularly cited the fact that there is a limited market for General Arts and Science Graduates, that is, a restricted number of appropriate, non-specialized, highly-qualified careers. In the view of this latter group, it is not surprising that enrolment declines are occurring since enrolments in general Arts and Science fields were already too large by 1970 and surpluses have flooded the labor force.

In a similar vein, the dramatic decrease in undergraduate Education enrolments during the latter part of the decade is frequently linked to declining labor market opportunities. During the 1970 decade, elementary and secondary school enrolment declined, thus reducing demand for new teachers. Some suggest that the difficulty in obtaining teaching positions, particularly in urban centres, was instrumental in discouraging many students from selecting the education field. Certainly, national media stress that most provinces have had an oversupply of teachers during the past few years. Whether or not students base decisions on this kind of information is debatable. In spite of student enrolment decreases in elementary and secondary schools, however, Alberta occupies a unique position among the provinces. A large, net in-migration has mitigated the effect of declining enrolments. For example, although calculated school age migration (net international and net interprovincial) to Alberta was 1,497 in 1971-72, it had escalated to an estimated 9,801 in 1979-80.[12] Alberta ranks first among Canadian provinces in the interprovincial in-migration of children.[13] Therefore, the labor market for teachers is likely to remain buoyant relative to other provinces which have experienced a net loss of school age migrants over the 1970 decade (e.g. Quebec and Ontario). It may well be that if faculty of education undergraduate enrolments are influenced by students' perception of labor market demand, Alberta students do not have an adequate knowledge of that labor market. The recent study by Dr. Loken, "Projecting K-12 Teacher Supply and Demand in Alberta," suggests that there is a very limited awareness of a growing need for more teachers in this province. The study predicts a teacher shortage for the near future based on current trends in the province. The author points out that many teachers are migrating to Alberta to fill existing positions. For example, in the one year period between April, 1978 and March, 1979 there were 919 interim certificates granted to teachers entering Alberta.[14] In total, 29.5 percent of new interim certificates for the 1970 decade were given to teacher imports.[15] The number of teacher imports combined with large population growth and decreased Alberta university education enrolments suggest that the teacher labor market in Alberta is likely to be better on graduation than the current first and second year enrolments would lead one to conclude. At least that is Dr. Loken's carefully arrived at thesis.

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[12] Dr. G. Loken, "Projecting K-12 Teacher Supply and Demand in Alberta." A study under contract to Alberta Education (soon to be made public), Edmonton, Alberta, August, 1980, p. 34.

[13] Statistics Canada, Catalog No. 81-216. Includes 16 and 17 year olds with no taxable income.

[14] Loken, p. 74.

As an explanation for changing student discipline choices, the state of the labor market would logically fit the trends in both Engineering and Graduate Studies and Research. Enrolments in Engineering have grown, the rapid demand for places in Engineering resulted in the 1976-77 quota system, and employers in Alberta report a corresponding labor market shortage of engineers which persisted during the 1970 decade. Conversely, there has been a static trend in the Academic labor market, a traditional employer of holders of advanced graduate degrees. Enrolments in the Faculty of Graduate Studies and Research have demonstrated a corresponding decline. As for the Law and Medicine Faculties the consistent increase over time seems to parallel a general population growth in the province. Supplies to the labor market are fixed, maintaining a supply-demand balance.

A more structured examination of isolated variables indicative of labor market demand for university graduates will be the subject of the next chapter. Other factors must be considered when examining enrolment trends, however. Space, equipment, staff and funding limitations can have a detrimental effect on the quality of certain programs.

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[15] Ibid., p. 73.

Many faculties or programs are forced to limit enrolments because of these limitations. Engineering has been unable to attract the resources deemed necessary for the controlled undergraduate expansion that the U. of Alberta Engineering Faculty has envisioned. Many other programs and faculties, not singled out in this section, operate under similar restrictions. Pharmacy, dentistry, nursing, rehabilitation medicine, medical laboratory science, agriculture and forestry, dental hygiene and physical education and recreation all function with limited enrolment or quota systems and applications to some of these programs frequently far exceed the admissions.

Moreover, one could speculate that the labor market can indirectly influence enrolments in a converse manner. That is, when there is a labor market shortage of qualified engineers, for example, salaries in the non-academic labor market rise to levels which seduce engineering staff into this market. The result is an academic engineering staff shortage because of the greater inflexibility in university budgets. This situation is occurring in Alberta, where labor market demand for engineers is higher than in other provinces while at the same time, the quota imposition was partly the result of the inability to attract a sufficient number of qualified staff to expand enrolments.

In summary, various faculty enrolments have fluctuated over time and for differing reasons. Changes in limited enrolment faculties do not reflect student preference or choice but rather policy or administrative decisions. Student perceptions about labor market demand may have some relationship to enrolment changes. At least, some faculties appear to have enrolment decreases which parallel a perceived drop in labor market demand. In addition, increased applications are to faculties where graduates enjoy more job opportunities. Generally, however, the faculties which enjoyed the greatest growth in the 1960s also showed the largest offsetting declines in the 1970s.

POTENTIAL LABOR FORCE ENTRANTS FROM ALBERTA UNIVERSITIES

The potential graduates or labor force entrants can be estimated fairly accurately from enrolment size. With the growth in enrolment comes a subsequent increase in the number of degrees and diplomas granted. In general, there has been a rise in the educational level of the Alberta labor force with increasing numbers who are degree holders.

Table 3.14 provides a breakdown of the total number of degrees awarded by Alberta universities for selected years. Historical data are limited as Alberta was not segregated from the prairies prior to 1968-69, nor were degrees listed by the granting institution in the Survey of Higher Education prior to this date. There has been a fairly static pattern in the number of graduate degrees awarded since 1971, with a difference of only 189 graduates between the highest and lowest years. The 1968-69 academic year is included to illustrate the magnitude of the growth spurt during the late 1960s. Between the latter academic year and the 1971 calendar year, there was a relatively large increase in the number of graduate and undergraduate degrees and diplomas awarded. Although the growth spurt had slowed by 1971, there continued to be a fairly steady increase in the number of undergraduate degrees awarded during the decade.

TABLE 3.14

DEGREES AND DIPLOMAS GRANTED BY ALBERTA UNIVERSITIES, 1968-69, 1971 to 1979

	1968-69*	1971	1972	1973	1974	1975	1976	1977	1978	1979
Total UNDERGRADUATE										
Alberta	-	3659	3941	4108	4296	4223	3976	4242	4475	4489
Calgary	-	1732	1891	1811	1961	1878	1985	1993	2081	2290
Lethbridge	-	327	382	253	213	232	227	288	337	374
	4315	5718	6214	6172	6470	6333	6188	6523	6893	7153
Total GRADUATE										
Alberta	-	710	733	712	615	624	641	615	646	754
Calgary	-	260	323	294	302	256	297	335	278	315
Lethbridge	-	-	-	-	-	-	-	-	-	-
	647	976	1056	1006	917	880	938	950	924	1069
Total GRADUATE AND UNDERGRADUATE	4962	6694	7270	7178	7387	7213	7126	7473	7817	8222

Sources: Offices of Institutional Research, U. of Alberta Data Book 1979-80, U. of Calgary Fact Book, 1979-80.
Office of the Registrar, University of Lethbridge Statistics, Volumes 1970/71 to 1979/80 inclusive.
D.B.S. Survey of Higher Education, 1961-69 Cat.# 81-211.
*D.B.S. data not segregated by province nor by institution for the prairie region prior to 1968-69.

Alberta shares with Canada a general upgrading in the educational level of the labor force. Although fewer university graduates enter the labor force than secondary school graduates, the percentage from university has grown at a faster rate than that from secondary school. A more thorough look at the destination of university graduates in the labor force is the subject of the next chapter.

SUMMARY AND CONCLUSIONS

This chapter was designed to answer certain questions and identify trends in university participation in Alberta. The information was necessary to comprehend changes in the supply of university trained manpower to the labor force and to anticipate future supply. Demographic variables, such as births, fertility rates and migration, were analyzed to determine the impact on the relevant university age cohort. Participation rates among provinces were compared and several projections about future participation in Alberta were presented. Finally, enrolments, graduations, discipline choices and the characteristics of students were examined over time to determine trends and changes that are eventually felt in the labor market.

Among the demographic findings is the expectation that 1983 will be the peak year for the 18-24 year old population in Alberta. That is, the baby boom children have reached postsecondary school age. Migration to this province, particularly since 1974, will augment the numbers of postsecondary youth for the remainder of the century. Alberta's population boom is thus expected to provide an age-eligible population that will remain consistently above the 1976, 18-24 age group size until the year 2001. No other province in Canada is given this forecast. The conclusion is that, based on demographic information, the potential for sustained high enrolment in post-secondary institutions, including universities, is greater in Alberta than in other provinces in Canada. The slight decline in university enrolments during the latter part of the 1970s came at a time when the postsecondary age group was expanding in Alberta. Both natural increase and migration contributed to this expansion.

It is obvious that increases in the size of the postsecondary age group do not necessarily produce university enrolment gains. There are also differences in participation rates, the percentage of the 18-24 year old population who choose to participate. Despite the fact that Alberta has the highest rate of net population gain among the provinces, it does not demonstrate the same promising university participation rate. Alberta's participation rate reached a high of 15.2% in 1970 and has declined steadily thereafter. By comparison, the national, full-time, university enrolment participation rate for the 18-24 year old population remained relatively stable during the past decade. It should be noted that historically all of the provinces registered large increases in university participation rates between 1962 and 1970 and that no provincial university participation rates have regressed to the levels recorded in 1962. Part-time university participation rates for 18 to 24 year olds in Alberta have historically been very low. These rates remained constant during the 1970s and were the lowest in Canada by the end of the decade.

Alberta emerges as somewhat of an anomaly in university participation rates. Demographically, it sits in an enviable position. The province also boasts the fact that occupational demand for university graduates is forecast to increase substantially over the next decade. Yet, participation rates in university are comparatively low. Several explanations are frequently offered. The first feasible explanation is that Alberta has a large 18-24 year old population of in-migrants. While the latter inflate the numbers on which participation rates are based, the majority represent job seekers and not potential full-time university students. At best, this provides only a partial explanation. The drop in Alberta full-time university participation began in 1971, before the dramatic increase in net migration to Alberta. Second,

> Newcomers in the 18-24 year old cohort represent approximately 21% of the total in-migration in a given year, but THEY STILL ARE ONLY 2.6% OF ALBERTA'S TOTAL 18-24 YEAR OLD POPULATION. (italics mine).[16]

In addition, high in-migration cannot be offered as an explanation for Alberta's lowest rating in part-time university participation since the majority of part-time students are also members of the labor force.

A final factor which limits in-migration as an explanation for declining university participation rates is the continued drop in the participation of Alberta grade 12 matriculants. During the last half of the past decade, a fairly constant percentage of grade 12 students qualified for matriculation. However, in a six year period, participation of this cohort in the subsequent year's freshman class declined from 54.9% in 1974 to 39.1% in 1979. This cohort survival technique suggests that more

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[16] OIR, Report 129, Preface.

Alberta high school matriculants are not proceeding directly into universities.

Many have speculated that the decline in full-time university participation in Alberta is a direct result of the growth of technical institutes and public colleges. There is insufficient evidence to support this hypothesis. It appears that university expansion preceded other post-secondary expansion. More important is the fact that in 1970, 20.5 percent of the 18-24 year old Alberta population were participating in full-time postsecondary education whereas this number had declined to 17.0 percent by 1979. Data from the last three years of the decade also challenge the notion that there is a simple transfer of students from universities to other postsecondary institutions. The decline in university enrolments is not accounted for with a concomitant increase in college and technical institute enrolments.

One could conclude that many students are going directly into the labor force after secondary school. At least the declining total post-secondary participation would suggest that such is the case. This early move into the labor force seems to include Alberta residents as well as young, job-seeking migrants. It is generally accepted that a boom economy tends to attract more youth directly into the labor force because of the availablity of employment. The decline in male university enrolment provides additional support for such a theory. Mega-project construction creates unskilled labor jobs which would be more suitable to the male sex or at least would be perceived so by employers. It is the male population who have mainly contributed to the declining university participation trend. The female sector of university students has grown over the past decade. Finally, in support of an early move into the labor force is the fact that while the proportion of university males relative to females has declined during the past decade, the male to female ratios in public colleges and technical institutes have been very stable over time. This lends credence to the idea that males are being filtered out of postsecondary education and into the labor market. If males were merely shifting to technical institutes or colleges instead of universities, the male to female ratio in the latter possibly may show an attendant alteration. The evidence, however, is insufficient to draw this conclusion. There may well be a far more complex shift than is outlined here. For example, it is possible that more males who formerly were destined for university are enrolling in public colleges and technical institutes while more male students who, in years past, enrolled in the college/institute sector are entering the labor force directly, somewhat of a downward "bump" of male students. This bumping explanation would produce the observed male to female ratios in the Alberta postsecondary system. More information than is currently available would be needed to clarify these postsecondary changes. It is important to note, however, that it is the male participation in full-time university education that has declined, not female. Also of interest is the fact that the increased participation of females is widely dispersed among faculties and is tending to follow general enrolment trends. That is, more females are registering in the professional, Business and Engineering Faculties while undergraduate, female education students, like male, are in decline.

There are not only shifts in sex ratios in universities but also shifts in age ratios. The full-time enrolled population is "aging." That is, there are fewer 17-20 year olds (particularly females) and a concomitant increase in 20-29 year olds (also a predominant female increase). However, the male, university population, is also aging. The largest volume of male university students fell within the 17-20 year old age category in 1971-72. By 1978-79, there were more male university students in the 21-24 year old group than in the younger cohort. Traditionally, the majority of females in university were in the youngest category. Apparently, females tended to enter directly out of high school and spend fewer years in university. However, while 57.7 percent of Alberta's full-time university females were between 17 and 20 years old in 1971-72, this figure had dropped to 43.8 percent seven years later. There was an attendant increase in females in the 21 to 34 year old age groups.

The general aging trend in university enrolees is also apparent in the non-university sector. The former hypothesis that more students are delaying entry to postsecondary institutions while they gained some work experience appears to be further supported by the changing age distribution of postsecondary students. To reiterate, alterations in the age structure of students also calls for a reassessment of the current cohort methodologies for calculating participation rates in university education. The advanced educational sector would be wise to gear itself towards a different, or at least a more diffused, age group of potential students.

Changes in choice of discipline also accompanied changes in the characteristics of students. The most predominant shifts were enrolment declines in Education,Graduate Studies and General Arts and Science programs, all of which showed the greatest gains in enrolment during the growth period for universities. Interest in professioal faculties increased along with demand for places in Engineering and Business Administration and Commerce. In the latter faculties, applications far exceed available positions and demography has little influence. Historically, it has been the general faculties that have depended on the number of secondary school graduates for first-year admissions. The changes in population trends have been more acutely felt in these general faculties. The drop in these general faculty enrolments, however, is an anomaly in light of the growing 18-24 year old population.

The financial implications of shifting faculty choice are notable. General programs and courses tend to be the least costly. The current decline in enrolments in more general areas combined with small increases or sustained enrolment in the specialized, professional and more expensive programs has the effect of raising the overall per student costs of university education. For many reasons, per student costs are likely to continue to increase at a time when government funding priorities are shifting away from advanced education. It is logical to assume that the current university trends will increase expenditures per student in constant dollars. Non-teaching positions are relatively insensitive to enrolment fluctuations and fixed costs do not decline with enrolment. Tenure impedes staff dismissals except in the lowest rank and wage categories which leads to a steady increase in average academic salaries. All these factors combined with the shift to more expensive program choices are likely to constrain the institutional effort to keep pace with technological and scientific advances. An aging teaching force itself might lessen the possibility of new ideas and approaches being introduced.

There is not any real consensus about what the future holds for Alberta universities. Enrolment projections demonstrate wide variations which suggest that prediction accuracy will ultimately depend on the method or combination of methods employed. The Grade 12 cohort survival technique along with the extrapolation of the trends of the 1970s provides a forecast of a dramatic decrease of ten thousand students during the 1980 decade. It is felt that this pessimistic outlook should be viewed with caution. Recent research findings indicate that even at the public school, elementary-secondary level, "School districts that predict enrollments successfully despite rapid enrollment changes generally combine two forecasting methods."[17] For school districts, it is recommended that historical enrolment trends and the cohort survival technique be combined with the study of variables such as mobility, average age of residents, local, provincial and federal birthrates as well as survey methods.[18]

At the university level, the cohort-survival technique has more obvious weaknesses. Postsecondary institutions vary in their relative power to attract students. Many factors need to be considered for accurate enrolment projections. The following quote is particularly applicable to the situation in Alberta.

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[17] Joyce King-Stoops and Robert M. Slaby, "How Many Students Next Year?" Phi Delta Kappan, May, 1981, p. 659.

[18] Ibid.

> Administrators need to take special care that the plans they make for the future of their institution derive from a careful forecast of their institution's particular strengths and weaknesses, not from national aggregate enrollment data.[19]

The school-age population forecasts published by Statistics Canada are those estimates deemed most appropriate at the national level. Projections of Alberta university enrolments based on these forecasts are likely to be understated. The unique position that Alberta occupies should be given consideration. The large net in-migration and the expanding, young population connotes a potentially far different impact on provincial universities than is the case at the national level. Finally, in forecasting enrolments, survey techniques have been very effective when combined with historical trends and cohort-survival techniques. Monitoring career plans of students is a trenchant tool in forecasting.

> ...simple telephone surveys are an excellent measure of an institution's academic image, and expected rates of attendance can be projected from such data as far as four years into the future.[20]

Current research, then, points to the necessity of combining many methods to produce accurate enrolment projections. This would be particularly applicable to a rapidly changing geographical area such as Alberta. Available data imply that in Alberta a lack of interest in this area of planning is combined with some inadequate methodology. In the opinion of this researcher, the data suggest that there is a good possibility of sustained, moderately high enrolments in Alberta universities during the 1980 decade rather than a continued rate of decline which some projections forecast.

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[19] James H. Wharton, Jerry J. Baudin, and Ordell Griffith, "The Importance of Accurate Enrollment Projections for Planning," Phi Delta Kappan, May, 1981, p. 655.

[20] Ibid.

The provincial dependence on national statistical forecasts and data in planning is evidence of cultural dominance of the central Canadian core. Two tenets, drawn from the world systems model, seem applicable to the Alberta situation:

> 10. That cultural dominance of Alberta by a central core would be apparent if general Canadian supply trends in higher education were duplicated in Alberta while the province was simultaneously experiencing anomalies in labor market growth and demand for university trained manpower.
>
> 11. That cultural dominance would also be reflected in similar patterns of financing for higher education in Alberta and the remainder of Canada.

Cultural dominance is manifest in Alberta in both enrolment and financing patterns. The ability to attract students and the academic image of the universities in Alberta appear to have undergone a recent attenuation, one that is common among the provinces. This change in attitude coupled with a shrinking proportion of provincial budgets earmarked for higher education, point to a pervasive core, cultural dominance.

During the 1970 decade, the economy of Alberta flourished, creating a high demand for manpower and a rapid growth in the labor force. Yet the simultaneous attenuation in university enrolments suggests that public opinion in Alberta is influenced by the dominant central Canadian attitudes and trends. T. Crawford, education editor for the

Toronto Star,[21] recently bemoaned the fact that Ontario was losing hundreds of university graduates every year to Alberta. Her suggested solution was that universities in Alberta should make greater efforts to increase existing enrolments in a move to more fully meet the demand for university trained manpower in Alberta with provincial graduates. Crawford's proposal has merit. Certainly the fact that highly trained manpower are entering Alberta from other provinces (while fewer Alberta university graduates leave) is one indication of the plentiful job opportunities for the highly educated in this province and the potential for the labor market absorption of larger numbers of Alberta university graduates. On the opposite side of this coin, however, is the fact that it is less expensive for the province to encourage in-migration of university-trained people. That is, other provinces foot the expensive postsecondary education costs while Alberta reaps the labor market benefits by attracting the highly trained after graduation. One could speculate that tight financial control over provincial universities would restrict domestic growth and expand labor market opportunities for migrants trained in other provinces.

In addition to supply trends, financing of postsecondary education shows a similar pattern in most provinces in Canada. Postsecondary education is funded partially through tuition fees (a small portion - usually less than 10 percent) with the remainder financed through the federal and provincial governments under The Federal-Provincial Fiscal Arrangements Act (1971, amended, 1977). Established Programs Financing, which came into effect in April, 1977, provided block payments for three programs - postsecondary education, hospital insurance and medicare. The provinces are under no obligation to spend the "designated" portion on any particular program. An article by Valerie Short[22] provides evidence that federal money "earmarked" for postsecondary education is being spent in other areas. These policy decisions suggest that support for universities is waning. In Alberta, the proportion of the budget designated for education (at all levels) has declined over the past decade. While fiscal restraint is understandable in provinces with a growing debt, financial constraints in Alberta seem inconsistent with the province's unique affluence. Moreover, the province has expanded fiscal support for other provincial projects and services and has a growing provincial civil service. Alberta seems to have adopted the culturally dominant trend in Canada of tight, financial control of higher education without the same financial justification. Per capita expenditures on education in Alberta now rank third in Canada. However, as a percentage of the total provincial budget, the amount spent on education in Alberta ranks near the bottom among provinces. Intertwined in the financial problems of higher education are the current renegotiations of Established Programs Financing between federal and provincial governments. In addition, there is a recent disagreement about what the role of a university should be. While the institutions try to sustain the liberal arts and humanities components, the provincial government restrains financing while suggesting that, if the universities are experiencing financial problems, they should re-direct money from the global budget to those programs in high demand. The inference is that the university should be more responsive to labor market demand and finance accordingly.

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[21] C.B.C. radio interview with Trish Crawford, January 27, 1981.

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[22] Valerie Short, "Federal Funding Due for a Change?" University Affairs, February, 1981, pp. 4-5.

In conclusion, the university enrolment declines that began in the latter part of the 1970s were not yet translated into a decrease in undergraduate degrees and diplomas granted by the end of the decade. There was a steady increase in the number of graduating students during the decade, although the increase was not as spectacular as that recorded in the 1960s. The number of graduate degrees and diplomas awarded, however, remained fairly stable throughout the decade. There has been a continuous increase in that proportion of the labor force who hold university degrees.

CHAPTER IV

DEMAND, SUPPLY-DEMAND IMBALANCES AND WAGES FOR UNIVERSITY-TRAINED MANPOWER IN ALBERTA

INTRODUCTION

The shift in focus in this chapter is towards demand. The analysis centers on the demand for university educated manpower and the degree to which Alberta supply meets these manpower requirements.

To provide a background, some comparative and historical material on labor force growth, and the growth in the university-educated segment of that work force, in Canada and Alberta, is presented. Not only is the current mushrooming of the work force in Alberta unique, but, in addition, Canada has been an anomaly in labor force growth when compared to the developed countries. The educational level of the labor force has sharply increased over the past fifteen years with many new members holding better qualifications.

One of the major problems in measuring labor market demand for university trained manpower is the lack of an existing instrument for exact calculation of general labor market demand in Canada. There are, nonetheless, many ways to approximate demand for workers. By combining many approaches a reasonable assessment can be made. Some of the general indicators of labor market demand are discussed early in this chapter: in-migration, unemployment and underemployment of university-trained manpower as well as the actual growth in managerial, professional and administrative occupations in the labor force. All of these act as barometers of demand. In particular, a more intensive treatment is given to managerial, professional and administrative occupational growth over the last half of the 1970s in Alberta. The latter method has some limitations but it does directly address one of the main concerns of this research. That is, has there been sufficient elasticity in demand for university educated manpower to accommodate the number of graduates? If the number of occupations requiring that level of training have increased faster than the number of labor force entrants with degrees from Alberta universities, one can assume that demand has been greater than supply and the need has been partially met through in-migration.

One of the problems of this method of measuring demand is the difficulty in determining in what occupations demand is greatest. For example, a very large shortage in a particular managerial or professional occupational group may obscure other areas where there is actually a surplus of university trained workers. For this reason, the chapter includes a breakdown in supply and demand for major groups of occupations as well as for individual occupations. In the latter, a Canadian occupational forecasting model is used as the source of data on demand for specific occupations in Alberta. Requirements for individual occupations are obtained from the model and compared to the output (subject to attrition) from related fields of specialization in Alberta universities. The result is the estimate of supply-demand imbalances for Alberta occupations which generally require university training.

One of the limitations in the supply-demand analysis in this chapter is the time constriction. Available data do not go back past 1975 and the analysis is bound by this time frame.

The final section of this chapter contains a brief, comparative look at starting salaries for university graduates in sample occupations. Again, the attempt is to ascertain if enrolment trends in universities tend to fluctuate in relation to changes in starting wages for university graduates. Mean starting wages from selected occupations in the private sector in Canada, Calgary and Edmonton over a ten year period are compared. Fluctuations in wages in Alberta are related to the enrolment patterns from 1970 to 1980.

A COMPARATIVE AND HISTORICAL LOOK AT THE LABOR FORCE AND EMPLOYMENT GROWTH IN CANADA AND ALBERTA

To fully understand the labor force in Canada it is enlightening to look at national growth rates. Although Canada has had one of the highest unemployment rates among modern industrialized nations during much of the past fifteen years, it nevertheless has simultaneously enjoyed one of the largest percentage increases in employment. Between 1963 and 1973, employment in Canada grew a monumental 43 percent.[1] By comparison, during the same period employment grew 26 percent in the U.S., 15 percent in Japan and 6 percent in Sweden. The large growth in the labor force (the employed plus the unemployed population over 15 years of age who are seeking employment) was attributable to high immigration and increased female participation combined with the expansion of the supply from the educational system and the baby boom.

As the supply from the education sector began to decline in 1978, the employment growth rate also began to decline in Canada. From 1975 to 1979 inclusive, the average annual increase in employment in Canada was 2.3 percent.[2] While the growth rate in employment dropped in Canada during the second half of the decade, the growth rate in employment in Alberta increased during the same period. From 1975 to 1979 inclusive Alberta experienced an average annual increase in employment of 4.8 percent[3], more than double the rate for Canada. In projections of employment growth rates from 1980 to 1985 inclusive, Canadian average, annual growth is expected to drop even further to 2.1 percent,[4] while the Alberta average is anticipated to rise slightly to 4.9 percent.[5]

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[1] Statistics Canada, Education, Science and Culture Division, Out of School - Into the Labor Force (Ottawa: Aug., 1978), p. 145.

[2] Statistics Canada, The Labor Force, Catalogue number 71-001, December, 1975-1979 (Annual averages).

Educational Attainment of the Labor Force

There has been a continual upgrading of the educational level of the labor force in Canada. Not only are young people staying in school longer but retiring, older persons are generally those who have less education. They are subsequently replaced by more educated youth. In particular, since 1961, there has been a massive increase in the number of labor force entrants who have postsecondary education. In addition, the percentage of the Canadian labor force who possess university degrees has more than doubled since 1961. According to the Census for that year, 4.7 percent of the labor force had a university degree. Although the data are not precisely comparable, The Labor Force annual averages presented in Table 4.1 indicate that 10.7 percent of the Canadian labor force were degree holders by 1980. The most rapid period of growth for Canada was between 1973 and 1975 when there was a full two percent increase in the proportion of the labor force with university degrees.

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[3] Ibid.

[4] Out of School - Into the Labor Force, p. 146.

[5] Estimate prepared by Planning Secretariat, Alberta Advanced Education and Manpower, Feb., 1980.

By comparison, Alberta's labor force had proportionately fewer university educated workers as reported by the 1961 Census. This is probably attributable to the fact that the province was outside of the core manufacturing center and had a large agricultural industry. These two factors would tend to reduce demand for highly skilled workers.

TABLE 4.1

PERCENTAGE OF THE LABOR FORCE WHO POSSESS
UNIVERSITY DEGREES, CANADA AND ALBERTA

	CANADA %	ALBERTA %
June, 1961*	4.7	4.3
June, 1973	7.3	n.a.
1975 (average)	9.3	9.5
1979 (average)	10.3	11.4
1980 (average)	10.7	11.0

*June, 1961 is not precisely comparable to other years because the figure is derived from Census data.

Sources:
1961 Census, adjusted to conform to Labor Force Survey by Statistics Canada in Out of School - Into the Labor Force, p. 152.

Statistics Canada, The Labor Force, Cat. # 71-001, December, 1975, 1979 and 1980, annual averages; June, 1973, Supplementary Survey.

The 1970 decade brought about a reversal in the national-provincial statistics. In Alberta, an increasing proportion of the labor force were degree holders. The rapid expansion of the oil industry and related petrochemical development, along with the decline in workers employed in agriculture, were at least partially responsible for spurring demand for highly educated manpower. Moreover, the general economic slump in Canada and the relative boom in Alberta began to attract university graduates from across Canada into the province. The Statistics Canada survey of 1976 university graduates substantiates this net migration to Alberta. The total number of 1976 university graduates interviewed in Alberta in June, 1978 showed a net gain of approximately 11 percent.[6] That is, Alberta had lost graduates to outside Canada, other provinces and had 160 of the sample whose residence was unknown. Nonetheless, in two years the province showed an 11 percent gain in 1976 university graduates over and above those graduates from provincial institutions.

It is expected that the increase in the educational level of the labor force will continue for some time to come. Alberta will probably show greater gains than the national average. However, it is not possible to estimate the increase in educational level by projecting university output. Over time, the cumulative total of university output will result in an unreliable figure because of double-counting. That is, many leave, return and leave again. Migration is also difficult to predict. However, it is likely that interprovincial migration to Alberta will continue as long as job opportunities are relatively more plentiful. The Labor Force suggests that demand for university graduates is high in Alberta. The following section deals with the measurement of labour market demand.

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[6] Statistics Canada, Education, Culture and Science Division, Job Market Reality for Postsecondary Graduates. Cat. #81 - 572E (Ottawa: March, 1981) p. 434.

MEASURING LABOR MARKET DEMAND FOR UNIVERSITY TRAINED MANPOWER

It is the intent here to explore avenues for measuring demand for university graduates in the market place. How does one measure whether or not the type of jobs available demand a university education? Are highly qualified jobs expanding to match the increase in provincial graduates as well as graduate in-migrants?

First of all, there is no presently existing method of exact calculation of labor market demand in Canada. It is apparently most difficult to estimate highly-qualified worker demand except in limited specialties. There are, however, ways of estimating labor market demand which clarify the links between education and the labor market. By comparing Canadian and Alberta data, some interesting and moderately precise information is available.

Migration. This method of estimating comparative labor demand has already been mentioned. We can assume that the movement of graduates from other provinces to the Alberta labor force is one indication that there is a provincial market for university graduates. Setting aside the question of underemployment, the growth in the degree holders in the labor force suggests that Alberta has more "highly-qualified" job vacancies than most of the other provinces. Moreover, the many migrants (Tables 4.2, 4.5) who are university educated suggests that there are insufficient provincial university graduates to fill all vacancies. The shortage of graduates is probably most concentrated in specific disciplines, such as engineering, which are geared to the economic needs of the province. Nevertheless, there are spin-offs to other employment fields during economic "boom" periods. An increase in population alone brings more demand for graduates in education, medicine, psychology, social work and the social sciences.

Unemployment. A second, rough indicator of demand is the rate of unemployment among university graduates. It has historically been the case that, with minor exceptions, the more education a person attains, the less his chance of involuntary unemployment. Those who now possess university degrees in Canada have an unemployment rate which is less than half the national average unemployment rate for the total labor force. Until recently, there was little mention of unemployment among university graduates. As the number of graduates continued to grow, some concern began to be voiced by educators about the problem, historically almost nonexistent, of graduate unemployment. Whether or not it is a current problem is a matter of definition. The Labor Force records increasing unemployment but a comparatively low rate for university graduates. In addition, Canada has experienced a massive increase in the highly educated segment of the labor force. It seems logical to expect an increase in graduate unemployment, at least in those occupations in which supply is increasing far more rapidly than replacement demand (attrition due to resignation, dismissal, retirement or death). Although Canada led the western industrialized world in the number of jobs created during the 1970s, annual job creation is tied to general economic development. The strong expansion during 1973 and 1974 resulted in very high job creation rates in Canada. This was also the period of most rapid growth in the university-educated segment of the labor force. Since 1974, annual job creation has declined in Canada, producing more unemployment. Unemployment of university graduates tends to fluctuate with general levels of unemployment but the relative position of the latter was fairly stable between 1975 and 1980 in both Alberta and Canada.[7]

When the problem of graduate unemployment is viewed from the comparative perspective, the relative position of university graduates did not deteriorate during the last half of the decade. In spite of the fact that large numbers of graduates were entering the labor force yearly, unemployment of graduates was consistently low.

To conclude, university graduates experience low rates of unemployment across Canada, and comparatively (compared to national figures) lower rates in the province of Alberta as recorded by The Labor Force. When 1976 university graduates were interviewed by province of qualification, Alberta had a higher percentage of employed graduates in June, 1978 than any other province in Canada.[8] The data suggest that if unemployment is used as a rough indicator of demand for university graduates in Alberta, the province is comparatively well off. It not only has less general unemployment than other areas of Canada but appears to have less university graduate unemployment as well.

Underemployment. It seems appropriate to introduce the topic of underemployment at this point since the concept is an additional way to measure demand for highly qualified manpower. Individuals working in jobs in which their training and experience are underutilized and/or undervalued are defined as underemployed. Closely related is the notion of a qualification spiral which is the escalation over time of educational requirements for jobs while the skill and knowledge needed to perform these jobs has not appreciably changed. The suggestion is that employers use formal credentials as a screening device to select what they assume to be the most productive and reliable workers in times of large supply.

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[7] The Labor Force, Cat. #71-001, 1975-1980.

[8] Statistics Canada, Education, Science and Culture Division, "Employment of 1976 University and College Graduates" (Edmonton: User Advisory Services, Aug. 17, 1979) p. 13.

Although the presence of underemployment cannot be ignored, the problem is a difficult one to measure. It is simple to segregate the employed from the unemployed. To quantify the degree to which certain skills are utilized in particular jobs is far more complex. Some recent attempts to quantify underemployment have been made, however, with no standard procedure in effect.

The Statistics Canada June, 1978 survey classifies university graduates as underemployed if they have a job that did not require a degree. Using this definition, 34 percent of all 1976 graduates working full-time in Canada in June, 1978 were underemployed.[9] Although no overall comparison is made between provinces, the breakdown of underemployed by field of study and province suggests that Alberta does not rank significantly above or below the national average in graduate underemployment. However, the sample is too small in some occupations to make reliable comparisons.

Another method has been utilized to assess underemployment. The 1975 survey of Ontario postsecondary graduates[10] uses a salary bench mark to gauge underemployment. The federal minimum salary for trainees with three-year B.A.'s in 1975 was $8,960. increasing to $11,230. for those with applied science degrees. However, 24.1 percent of university graduates surveyed in September, 1975, earned less than $9,000. annually.

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[9] Job Market Reality For Postsecondary Graduates, p. 134.

[10] Statistics Canada survey conducted for the Ontario Ministry of Colleges and Universities, September, 1975. Cited in Out of School - Into the Labor Force, p. 196-197.

Different definitions of underemployment change the statistics but the phenomenon still remains. Whether in the form of low salaries or underutilization of skills, it is clear that underemployment is a problem in Canada and Alberta today. To determine the degree of underemployment in Alberta, however, is beyond the scope of this study. It is important to recognize that the problem is one facet of labor market demand for university graduates that is of recent origin. It specifically addresses the question of whether or not the type of jobs available demand a university education.

On the other side of the coin, of course, is the double bind in which students are placed. A university degree does not guarantee a job that will utilize the graduate's skills, but if he does not have a degree his chances of getting the job are further reduced. The credential is often a necessary but not a sufficient condition for suitable employment. In the end, the debate is academic. The student may need the degree to acquire a job even when that job does not fully utilize his skills or compensate him adequately. In its own right a qualification spiral creates a higher demand for university trained manpower in the market place. Like all vicious circles, once the process is in motion it is difficult to halt or reverse.

Growth in Managerial, Professional and Administrative Occupations.

A more direct method of measuring demand for university manpower is to examine the growth in those occupations which generally require that level of education. An increase in managerial, professional and administrative occupations is here used to estimate the employment opportunities for university graduates. In The Labor Force, "Managerial, Professional, etc." includes managerial and administrative, natural sciences, social sciences, religion, teaching, medicine and health and artistic and recreational occupations. The intent is to determine if the increase in these occupations has been close to the increase in the numbers of labor force entrants with university degrees. That is, are the number of highly qualified jobs increasing at the same rate as the degreed labor force?

There are several limitations to this approach. First, not all of the managerial-professional occupations require a university degree. Indeed, some do not demand any post-secondary training. For the majority of the occupations listed under the "managerial-professional, etc." category, however, a university degree has become a prerequisite. The occupations are listed in the Canadian Classification and Dictionary of Occupations and carry a skill level which denotes specific vocational preparation (SVP) and/or general educational development (GED) required for each occupation. (See Appendices A and B).

A second limitation is that not all employed university graduates move into the managerial-professional group. Two graduate surveys, however, conducted in 1973[11] and 1978,[12] suggest that somewhere between 66 and 80 percent of employed, young university graduates were working in these occupations.

Historical comparisons are not available as Alberta data were not segregated by occupation and education prior to 1975. In spite of these shortcomings, a comparison of the growth rates in the managerial-professional occupations with the growth rates in the number of labor force entrants with university degrees is one method to identify major trends in supply and demand for university graduates.

Table 4.2 provides a recent comparison of the annual increase in Canada and Alberta in employment in managerial, professional and administrative occupations compared to the number of labor force entrants with a university degree. In both Canada and Alberta, there were more managerial-professional jobs created between 1975 and 1980 than there were actual university graduates entering the labor force. However, the rate of increase (annual average percentage increase) in university graduates entering the labor market outstripped by a small margin the rate of managerial-professional job creation at both the national and provincial level. Nonetheless, because there was not a large difference in the two rates of growth and also because there were more occupations than graduate entrants (a larger base on which to calculate percentages) demand grew faster than supply in round numbers.

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[11] Ministry of State for Science and Technology and Statistics Canada, Highly Qualified Manpower Survey, 1973.

[12] Employment of 1976 University and College Graduates, June, 1978.

TABLE 4.2

ANNUAL GROWTH OF EMPLOYMENT IN MANAGERIAL, PROFESSIONAL AND TECHNICAL OCCUPATIONS AND LABOR FORCE ENTRANTS WITH POSTSECONDARY EDUCATION, CANADA AND ALBERTA

	1		2		3		4		5		6	
Year	Employment in Managerial, Professional Administrative Occupations		Annual Increase		Annual percentage increase in Employment $(\frac{2}{1} \times 100)$		Number of Labor Force Entrants With Uni. Degree		Annual Percentage Increase of Labor Force entrants with university degree		Annual % Increase of Labor Force entrants with post-secondary graduation	
	Canada (000's)	Alta. (000's)	Can. (000's)	Alta. (000's)	Can. %	Alta. %	Can. (000's)	Alta. (000's)	Canada	Alberta	Can.	Alta.
1975	2008	161	-	-	-	-	na	na	-	-	-	-
1976	2095	176	87	15	4.3	9.3	45	17	4.9	21.8	-4.3	1.0
1977	2161	183	66	7	3.2	4.0	58	2	6.0	2.1	2.4	3.5
1978	2255	215	94	32	4.4	17.5	54	13	5.3	13.4	4.4	5.3
1979	2373	219	116	4	5.1	1.9	73	6	6.8	5.5	1.4	2.7
1980	2440	231	67	12	2.8	5.5	75	2	6.5	1.7	6.1	6.6
Annual Average over 5 Years	-	-	86	14	4.0	7.6	61	8	5.9	8.9	2.0	3.8

Sources: Statistics Canada, The Labor Force, Cat. # 71-001. Annual averages 1975-1980.

Statistics Canada, Out of School - Into the Labor Force, Cat. # 81-570E, p. 155.

In addition, the job creation rate excludes replacement demand. For example, more than the 12,000 appropriate, new jobs were available to university graduates entering the Alberta labor force in 1980. Entrants were also able to fill those managerial-professional positions vacated through death, dismissal, retirement and resignation.

In terms of a national-provincial comparison, Alberta was considerably ahead of the national averages in both the managerial-professional job creation rate and the annual average percentage increases in that segment of the labor force possessing university degrees. That is, the growth in both areas over the five years was higher in Alberta. Moreover, the gap between the number of jobs created and the annual average number of labor force entrants was wider in Alberta during this time period. There were seemingly more jobs available for a proportionately smaller number of university-educated labor force entrants than were at the national level. Averaged annually, some 8,000 candidates competed for 14,000 managerial-professional jobs created in Alberta as well as for similar jobs vacated through normal attrition. Nationally, however, 61,000 yearly graduates competed for 86,000 newly-created managerial-type jobs yearly. Competition for the appropriate available jobs among Alberta university graduates was thus less than on the national scene.

In Alberta there appears to have been an improvement in managerial-professional job opportunities between 1975 and 1980. There were 78,000 university graduates in the Alberta labor force in 1975 while 161,000 of the labor force were employed in managerial-professional occupations (83,000 more than university graduates). By 1980, there were 118,000 degree holders and 231,000 jobs, or, an excess of 113,000 appropriate jobs over degree holders in the labor force.[13]

One of the shortcomings of this analysis is that jobs that do not require a university degree are included in the managerial professional category. Although the vast majority of the occupations listed in the Canadian Classification and Dictionary of Occupations in the managerial-professional major groups carry a prerequisite degree, others do not. Among those that do not are jobs that employ large numbers of workers, such as the technicians, nurses and nursing assistants employed in the medical and health field. Many of the occupations, including chemists, engineers, architects, physicists, geologists, agriculturists, biologists and systems analysts have support technicians who frequently carry credentials from non-university, postsecondary institutions. We can conclude that the competition for the managerial-professional occupations includes other postsecondary graduates as well as those possessing university degrees. The labor force in 1979 and 1980 had roughly an equal number of workers holding university degrees as postsecondary certificates or diplomas.[14] While there was a fairly large annual average percentage increase in the number of labor force entrants with university degrees over the 1975 to 1980 period, there was not a corresponding increase in the number of postsecondary certificates or diplomas. Therefore, if all postsecondary graduates (column 6 in Table 4.2) are included, the annual rate of increase in postsecondary entrants to the Alberta labour force was less than the annual rate of increase in managerial-professional occupations. Job opportunities for postsecondary graduates were steadily improving over the five year period. If the relative rates of increase were to continue over time, the excess of appropriate jobs over postsecondary candidates would continue to increase and the general tendency would be higher demand for a diminishing supply of highly qualified ~~workers~~.

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[13] The Labor Force (Cat. # 71-001), December 1975-1980, annual averages.

[14] Ibid, December, 1979 and 1980.

Worthy of further discussion is this obvious alteration in the type of credentials that labor force entrants in Alberta (as well as in the remainder of Canada) possess. The numbers of university graduates have greatly increased while those possessing other postsecondary diplomas and certificates have remained static during the five year period. There were 122,000 labor force members with postsecondary certificates in 1975 but only 123,000 by 1980 (in 1979, they had actually declined to 110,000 - less than the 116,000 university graduates in the labor force in the same year)[15]. What are the logical explanations for such a trend? One possibility would be declining numbers of graduates from Alberta colleges and technical institutes. Such has not been the case. There have been yearly increases in the numbers of non-university, postsecondary graduates with over three thousand yearly by the mid-1970s.[16] A second plausible explanation would be that more college and technical graduates do not join the labor force. However, there was also an estimated decline in the total population, both labor force members and non-labor force members, who held these postsecondary credentials.

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[15] Ibid., 1975-1980.

[16] Job Market Reality for Post-Secondary Graduates, p. 116.

Why, then, are large numbers of new, postsecondary graduates not inflating either population or labor force statistics? Out-migration does not explain the loss since at least one study during the period indicated that Alberta had a small net gain in college graduates.[17] The answer may logically lie in the concept of a qualification spiral. It appears that many college graduates are continuing on to university or are subsequently leaving the labor force to obtain university degrees. This would also explain why the university degree segment of the labor force increased so rapidly. It may well be that some of the newly-created managerial-professional positions do not demand the knowledge or skill acquired through university training but employers have raised the educational prerequisites for attaining these jobs. This qualification spiral may draw students into the university system because the higher credentials open new job opportunities whether or not the training is essential for job skills. Moreover, an additional incentive may lie in the knowledge that other postsecondary graduates, on the average, earn less than university graduates.[18]

This analysis does not reveal the exact nature of the new jobs created. Were they mostly the managerial and professional jobs demanding university training? This would explain the much larger increase in university degrees. It is more likely, however, that there were also increases in those technical-type jobs generally filled by college graduates. For example, new engineering jobs also bring increased demand for engineering technologists. Again, one is led to conclude that a qualification spiral is pulling more university graduates into occupations that were formerly the domain of alternate postsecondary graduates.

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[17] Ibid., p. 435.

[18] Ibid., p. 10

In summary, it would appear that the growth in managerial, professional and administrative occupations has been greater than the growth in actual university graduates entering the labor force in both Canada and Alberta. Thus, earlier dire predictions about the future oversupply of university graduates relative to highly-qualified occupations have not materialized, at least not to the extent predicted. There are several historical reasons why extreme predictions about the state of the labor market for university graduates have not come true. Briefly, they include:

1. The job creation rate in Canada remained higher for managerial-professional occupations than for the overall labor force. In Alberta, the 1970 decade spawned very large increases in these occupations.
2. Although the annual output from universities continued to grow, the rate of growth began to slow during the early 1970s. The annual percentage increase in labor force entrants with university degrees did not mushroom to the extent predicted during the late 1960s and early 1970s.
3. The annual rate of increase in the number of labor force entrants with postsecondary graduation was less than the

annual rate of managerial-professional job creation during the last half of the 1970s. With almost no growth in the labor force possessing alternate postsecondary credentials, university students were not competing with these other graduates. A decade earlier, between 1966 and 1971, there was an average annual percentage increase in labor force entrants with postsecondary graduation of 12 percent in Canada.[19] Alberta seemed to follow a pattern resembling the national one during this time period. The sudden reduction in this postsecondary rate of growth tended to maintain a better labor market for graduates than the earlier prophecies had predicted. The increase in labor force members with degrees relative to other postsecondary graduation suggests that there may be a qualification spiral, however.

In conclusion, labor market demand in Canada, when measured in the manner employed here, remained high for university graduates into the current decade. The numbers of managerial-professional jobs created in Alberta far exceeded the number of university graduates in the labor force competing for these occupations. In Alberta, employment opportunities actually improved between 1975 and 1980.

In the earlier supply chapter, it was suggested that potential university students may be guided in their career path by perceived notions about the labor market. Thus, some people speculate that the enrolment declines that were recorded in Alberta universities during the last half of the 1970s were in fact a response by students to reduced labor market opportunities. It would appear that if all highly qualified occupations (defined as "managerial-professional, etc.") are lumped together, occupations for graduates were expanding in Alberta. Thus, while enrolments in provincial universities were shrinking, opportunities for obtaining suitable employment were growing in the province. If students were guided by their perceptions about the labor market, it is possible that their perceptions were not entirely accurate.

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[19] Out of School - Into the Labor Force, p. 155.

SUMMARY OF EMPLOYMENT GROWTH AND LABOR MARKET DEMAND IN CANADA AND ALBERTA

It is apparent that, compared to other nations, Canada has experienced a very large growth in employment over the past twenty years. Not only has the labor force expanded tremendously but there has been a large increase in the educational level of the labor force. The percentage of the latter who are university graduates more than doubled over the past two decades. This rapid expansion led to speculation about the elasticity of demand for highly educated manpower in Canada. Certain questions arose, such as, will the highly qualified occupational sector continue to expand at a rate that is sufficient to absorb increasing numbers of university graduates? More specific to this research was the question of demand for university graduates in Alberta relative to the remainder of Canada.

The main obstacle facing researchers is the lack of a direct and precise method to measure labor market demand. Some of the indirect ways of estimating demand for highly qualifed manpower include those previously discussed: in-migration, unemployment among the educated and underemployment in which an individual's training is underutilized and/or undervalued. In terms of in-migration of university graduates to Alberta, the conclusion reached was that the influx during the late 1970s was an indication of comparatively more job opportunities here than in most of the remainder of Canada.

Unemployment trends suggest particular interpretations. First, university graduate unemployment is low in both Canada and Alberta when compared to general rates of unemployment. Second, between 1975 and 1980 general rates of unemployment for university graduates did not increase. Finally, the rate of unemployment among university graduates is lower in Alberta than at the national level. This evidence suggests that demand for graduates is not deteriorating and that it is higher in Alberta due to the recent economic boom. The data on underemployment are incomplete but they do point to the presence of a qualification spiral that is prevalent in all provinces including Alberta.

A more direct method of measuring demand for university trained manpower is the analysis of the growth in managerial, professional and administrative occupations. The "managerial-professional, etc." job creation rate when compared to the number of university graduate labor force entrants suggests that demand has remained high during the latter half of the 1970s. Job creation in Alberta has outstripped the national rate and has remained well above the number of labor force entrants with degrees.

These findings are not unexpected in the context of the world systems model. The final four pages of Chapter 2 contained a detailed list of propositions or expectations which the model would suggest for Alberta. Several of these tenets seem to be confirmed by the foregoing data on labor force changes.

Tenet 1: That during the expansion period in the world capitalist system Alberta's peripheral position to a central Canadian core would suggest economic as well as cultural dominance including:

- a) General Canadian economic growth producing similar patterns of supply and demand for university educated manpower across Canada.
- b) Highest demand in the more developed core producing "brain drain" phenomenon from Alberta to central Canada.
- c) Cultural dominance in which periphery accepts prevailing core rationale for higher educational expansion.

Tenet 2: That the contraction period in the world capitalist system has brought an unanticipated economic surge to Alberta's relative position in the Canadian mini-world system. Alberta is now a strong semi-periphery in which unique labor market trends might be anticipated.

Tenet 3: That labor market growth in Alberta has been, for economic reasons, consistently high including the "professional" or university trained market.

Tenet 8: That high labor market demand for university trained manpower in Alberta, coupled with lowered demand in other areas of Canada, should bring professional migration to Alberta - a reverse brain drain to a strong semi-periphery.

Prior to the 1970s and during the expansion period in the world capitalist system, Alberta patterns of supply and demand generally followed those trends prevalent in central Canada. As tenet I in Chapter III dictates, there was a general prevailing Canadian rationale for higher educational expansion which was bolstered by the large increases in employment in Canada during the 1960s. It was expected that a "brain drain" from Alberta to the stronger central core was prevalent. Table 4.1 does indicate that there were fewer university educated members of the labor force in Alberta compared to Canada when expressed as percentages. However, this may have been due to the fact that a lower percentage of the Alberta population sought university degrees. The economic changes during the contraction period in the world system have given Alberta an unanticipated economic surge. The data in Tables 4.1 and 4.2 suggest that, whether or not there was a "brain-drain" to central Canada in the 1960s, there appears to be a reverse brain-drain to Alberta during the 1970s. The labor force in the province has gained far more university graduates than the provincial university output during the last decade. Thus, the work force is comparatively better educated than the general national labor force with a larger percentage of degree holders. This lends support to tenet 8 from the world systems model: that higher labor market demand in Alberta coupled with lowered demand in other areas of Canada should bring professional migration to Alberta.

Additional confirmation for tenets 2 and 3 from the model is provided by the foregoing analysis. In particular, labor force growth in Alberta has been very rapid including the university educated segment of that work force. Moreover, the labor market trends in Alberta during the last half of the 1970s were unique in Canada demonstrating the economic upsurge that was noticeably absent in most of the other provinces.

In conclusion, this section was an attempt to compare labor force growth as well as demand for university graduates in Canada and Alberta. In so doing, The Labor Force was the prime source cited and it is the main ongoing, statistical update of Canada's work force. However, The Labor Force does not provide a breakdown of the growth in specific occupations or even in occupational groups by province. Therefore, one is not able to use this source of data to provide a finer estimate of labor market demand for specific disciplines. Yet, it is vital to get a more refined category than "managerial-professional, etc." A large shortage in one field may well mask several areas where there is an oversupply of professionals.

The following sections of this chapter will focus mainly on Alberta and will include: demand, as measured by an occupational forecasting model, for major groups of occupations and the relationship of related university supply to these discipline groups. In addition, a similar comparison of supply and demand for specific occupations will be made.

MAJOR OCCUPATIONAL GROUP DEMAND

The object of this section is to prepare a more precise breakdown of demand for major groups of occupations and to relate the available university supply to this demand. Not all occupations grow at the same rate over a period of time. The attempt is to clarify demand for major groups of occupations in Alberta since 1975 and to project demand to 1985, the year in which today's high school seniors will begin to emerge from university. Demand is estimated in COFOR, The Canadian Occupational Forecasting Program.[20] It provides a discipline breakdown of employment prospects for students already enroled in the university system. To relate supply to this demand, the number of graduates from major group disciplines in Alberta universities since 1975 will be compared to the estimated labor market demand during the same time frame.

The measurement of demand or occupational requirements used in this section is produced by the Canada Department of Employment and Immigration with the cooperation of the respective provinces. The methodology of COFOR, The Canadian Occupational Forecasting Program, follows the manpower requirements approach developed in the early 1960s by the Organization for Economic Cooperation and Development. It is a computerized system based on the employment projections for 69 industries.

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[20] Canada Employment and Immigration, Labor Market Supply and Demand Analysis Division, Occupational Requirements to 1985:COFOR (Ottawa: January, 1981).

> Future levels of industrial output are forecast, along with the employment levels, then employment is divided into requirement for specific occupational groups. COFOR links output and employment growth for 69 industrial sectors to a general medium-term forecast of the Canadian economy. Occupational profiles of the industries, as measured in the 1971 Census and in the 1975 Occupational Employment Survey, are then used to convert projected industry employment levels into estimates of requirements for some 496 occupational groups.[21]

In addition to net job creation from industrial growth, COFOR also estimates probable deaths and withdrawals for each occupational group. They do this by computing the age/sex profile of each industry from the Census and consulting mortality tables prepared by Statistics Canada. Regional variations in the model are prepared by Regional Economic Services of Employment and Immigration in conjunction with interested provincial government personnel. Thus, provincial forecasts are generated.

COFOR is here used to estimate the degree to which demand in major groups of occupations is related to the numbers of Alberta graduates in these disciplines who move directly into the Alberta labor force.

There are limitations involved in the use of this model. In the first place, it is a forecast of occupational requirements, an econometric model which is an imperfect method of describing relationships between labor market and economic variables. It is not comparable to The Labor Force where estimates are derived from monthly surveys of a sample of the labor force in Canada. Allowing for sampling error, the latter survey describes the current state of the labor market with reasonable precision. The figures presented through COFOR are not actual but are the projected estimates generated from the model.

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[21] Ibid., p. 5.

The COFOR model was first used in 1975. Thus, there are no historical comparisons available prior to this date. In addition, although Alberta Advanced Education and Manpower published Alberta forecasts for 1975, Employment and Immigration in Ottawa abandoned efforts to generate forecasts for highly qualified manpower. The Director of Strategic Policy and Planning[22] reports that there are more difficulties involved in forecasting highly qualified jobs than there are in forecasting medium and low skilled occupations. Part of the difficulty lies in the relationship of the occupations to the 69 industries. For example, in preparing the Ottawa forecasts, all veterinarians were relegated to the agricultural industry, and there was an anticipated drop in output from the agricultural sector. As a result, projected requirements for veterinarians were very low. However, many veterinarians work outside of the agricultural industry in private, urban clinics and animal hospitals. Since it is sometimes difficult to link highly qualified manpower to specific industries, input from professional associations about their membership is solicited by those generating the forecasts.

An additional limitation is that the model links employment growth to a medium-term forecast of the Canadian economy. A slowdown or upturn over an extended period (several years, given that the model is medium term) can occur. These economic changes can thus render incorrect the key assumptions about economic growth under which the projections are generated.

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[22] Telephone conversation in March, 1981 with the Director, Strategic Policy and Planning, Department of Employment and Immigration, Ottawa.

Two sets of requirements are cited in this research, those released in 1976 by Alberta Advanced Education and Manpower as well as The Alberta Regional Economic Services (Employment and Immigration) in consultation with Alberta Advanced Education COFOR requirements released in January, 1981. The first set was to cover the period 1975 to 1982 but energy-related and demographic developments necessitated the generation of the latter set of requirements, 1979 to 1985. The major groups of occupations from the earlier forecasts are isolated first.

The "managerial-professional, etc." category is subdivided in Table 4.3 into seven major groups of highly qualified occupations: managerial-administrative; natural sciences, engineering and mathematics; social science; religion; teaching; medicine and health; arts and recreation. The Canadian Classification and Dictionary of Occupations.[23] code numbers identify the major groups (see Appendix C for a four-digit breakdown of occupations). The vast majority of highly qualified jobs are concentrated in four major groups: managerial-administrative, natural and applied sciences, teaching and medicine and health. It is in these four fields that requirements over

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[23] Canada Employment and Immigration, Annual Guide 1978-79. For a detailed breakdown of 7-digit occupations refer to Volumes 1 and 2, Canadian Classification and Dictionary of Occupations (Ottawa: Information Canada, 1971) The latter identifies and describes about 25,000 occupations.

TABLE 4.3

ALBERTA-OCCUPATIONAL FORECASTS (COFOR MODEL) 1975-1982

CCDO CODE*	Occupational Category Description	1 Employment (Demand) 1975	2 Employment (Demand) 1982	3 Net Change (2 - 1)	4 Withdrawals Deaths 1975-1982	5 Requirements 1975-1982 (3+4)	6 Percentage of 1975 Demand (5 ÷ 1)
11	Managerial Administrative	32,030	43,902	11,872	10,412	22,284	69.57
21	Natural Sciences Engineering Mathematics	23,612	31,714	8,102	5,373	13,475	57.07
23	Social Sciences	7,131	10,160	3,029	1,683	4,712	66.08
25	Religion	1,847	1,864	17	635	652	35.30
27	Teaching	30,996	37,293	6,297	7,478	13,775	44.44
31	Medicine and Health	36,614	54,640	18,026	8,113	26,137	71.39
33	Arts and Recreation	6,033	8,888	2,855	1,144	3,999	66.29

Prepared by: Planning Secretariat, Alberta Advanced Education and Manpower, Summary of Canadian Occupational Forecast (COFOR) Model Results for Alberta 1975-1982. (Edmonton: March, 1976)

*Canadian Classification and Dictionary of Occupations the seven year interval are estimated to be the greatest. In terms of percentage increases, medical and managerial occupations were anticipated to show the highest gains, both demanding new recruits (column 5, requirements) approximating more than 20,000 between 1975 and 1982.

It was generally felt by those[24] generating the COFOR forecasts that rapid changes in the Canadian economy rendered the 1975 forecasts for Alberta prematurely inaccurate. In particular, researchers concluded that highly qualified requirements were under-estimated for certain major groups of occupations. In general, the total "managerial-professional, etc." segment was expected to have larger requirements than estimated in COFOR 1975. New forecasts from the model were released in 1981 using 1979 as the initial or base year of the forecast. COFOR 1979 to 1985 is contained in Table 4.4 and outlines requirements for the same major groups of occupations. As indicated in column 1, the employment in 1979 had already surpassed the earlier projections for 1982 in 5 of the 7 major groups. The two exceptions were social sciences and medicine, the latter having had a projection in 1975 suggesting unusually large growth. In these areas demand was much greater than had been forecast and the new expectations were due primarily to the energy-related and demographic developments in the province. A moderate to high growth rate is expected for the major groups of occupations up to 1985. Because Alberta projections are designed to fit the economy of the province, the rapid growth of the last half of the 1970s is expected to temper little up to 1985. Alberta employ-

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[24] Information obtained in an interview with Lynn Tait, Manpower Planning, Planning Secretariat, Dept. of Advanced Education and Manpower.

TABLE 4.4

OCCUPATIONAL REQUIREMENTS FORECASTS, 1979 - 1985, ALBERTA (COFOR MODEL)

		1	2	3	4	5	6	7
CCDO CODE	Occupational Category Description	Employment (Demand) 1979	1985	Net Change (2 - 1)	Withdrawals Deaths 1979 - 1985	Requirements 1979-1985 (3+4)	Percentage of 1979 Demand (5 ÷ 1)	Canada Percentage of 1979 Demand
11	Managerial Administrative	48,595	68,065	19,475	5,285	24,760	50.95	29.35
21	Natural Sciences Engineering Mathematics	40,265	56,880	16,620	2,620	19,240	47.78	28.29
23	Social Sciences	9,590	13,960	4,375	895	5,270	54.95	30.93
25	Religion	2,040	1,065	- 975	230	- 745	-36.52	20.14
27	Teaching	44,330	53,935	9,615	4,760	14,375	32.43	15.05
31	Medicine Health	44,005	57,915	13,930	4,850	18,780	42.68	32.21
33	Arts and Recreation	9,405	12,970	3,560	760	4,320	45.93	35.26

Source: Regional Economic Services, Canada Dept. of Employment and Immigration, Edmonton, February, 1981. Computer printout.

Canada Data: Labor Market Supply and Demand Analyses Division, Dept. of Emplyment and Immigration, Occupational Requirements to 1985, COFOR (Ottawa: January, 1981).

ment growth is anticipated to remain well ahead of the remainder of Canada as shown in column 7 of Table 4.4.

Both Alberta COFOR runs projected a healthy increase in most major groups in the managerial-professional category. Religion, which constitutes a small segment of total employment, was an exception. The newer projections (COFOR 1979-1985) show a decline in demand for religious occupations. The other areas, however, were expected to show increases in expansion demand which, when added to replacement demand, would keep requirements fairly high.

To summarize, the COFOR estimates of occupational requirements for Alberta suggest that jobs for the highly qualified grew very rapidly in the latter part of the 1970's, with only a slight moderation in growth anticipated in 1985. This differs from general Canadian trends in which highly qualified employment is expected to grow at a significantly slower pace than in the past and lower than average for all skill levels from 1979 to 1985.

The model estimates, while not directly comparable to The Labor Force, suggest the same general trends for Alberta. Since The Labor Force is based on regular surveys of a sample of the work force, it appears that the COFOR methodology produces estimates which are reasonably close to the actual labor force growth rates. If anything, the model is conservative in underestimating the rate of growth in the managerial-professional sector. Its projections for the total sector are consistently below those published in The Labor Force.

One point that is emphasized in the major group breakdown in occupations from COFOR is the between-discipline variation in employment. Some major groups constitute a very small percentage of the total highly qualified labor force so that even large percentage increases in employment do not amount to large numbers of new workers being absorbed into these occupations. On the other hand, some major groups employ large numbers of workers to begin with. When there are generous increases in demand in these fields, they may absorb many thousands of workers in a given year. In the case of the managerial-administrative C.C.D.O. code 11 and C.C.D.O. code 21, the natural and applied sciences, the COFOR estimates indicate both a large number of initial workers coupled with hefty increases in requirements. Supply to these areas would need to be very high to satisfy demand.

These optimistic COFOR forecasts for the highly qualified work force are based on a medium-term economic forecast for Alberta. If the economic assumptions under which the forecasts are generated are not borne out, changes or new forecasts would become necessary. It appears that the premature release of the second COFOR (1979-1985) was attributable to more rapid economic expansion than previously anticipated which rendered the COFOR 1975-1982 too conservative. One possible source of change which could affect the 1979-1985 COFOR is contained in the world systems tenet number nine:

> That cultural and economic dominance by the core will continue to be manifested by a drive for "internal consolidation" with more balanced Canadian growth. Power struggles between core and semi-periphery may possibly mitigate demand for skilled manpower in Alberta as core asserts economic dominance, possibly through resource taxation.

In hindsight, it is evident that a current slowdown in the Albertan economy in 1981 was attributable to national-provincial energy debates, as well as other economic factors, which carried over several months and had a noticeable impact on the Alberta labor force. It is precisely these unpredictable events which tend to alter projections of labor force demand.

With estimates of worker demand established, attention is now turned to highly qualified worker supply. The following section deals with Alberta university degree output available to the provincial labor force.

UNIVERSITY OUTPUT (SUPPLY)

It is the intent of this research to relate Alberta supply to demand for university-trained manpower in Alberta. Does the supply from Alberta sources approximate Alberta demand for the major groups of occupations listed in Tables 4.3 and 4.4?

The total degree output from the universities in Alberta for the five years 1975 to 1979 inclusive is contained in Table 4.5.

TABLE 4.5

TOTAL ALBERTA DEGREES* GRANTED, 1975 to 1979

1975	1976	1977	1978	1979	Total	Annual Average
7167	7053	7430	7820	8031	37,501	7500

Source: Statistics Canada, Universities: Enrolments and Degrees, Cat.# 81-204, 1975-1979.

*Excludes Diplomas and Certificates.

Future supply from the universities is anticipated to drop slightly as a result of the enrolment declines in the late 1970s. Because 1980-81 Alberta university enrolments showed a small increase and yearly in-

TABLE 4.6

PROJECTED TOTAL ALBERTA DEGREES GRANTED, 1980-1982

1980	1981	1982	Annual Average
7593	7480	7340	7471

Source: Statistics Canada, Advance Statistics of Education, 1981-82. Cat. # 81-220, August, 1981.

creases are anticipated at least until 1982-83,[25] there will again be an expected increase in degrees ~~granted~~ after the normal lag period. Thus, the annual average of 7500 total degrees granted between 1975 and 1979 is likely to remain a realistic estimate of the annual average total degree output from the universities in Alberta until 1985 although there are as yet no advance statistics for 1983-1985.

There are some changes in the degree output by area of specialization. However, the average annual supply from universities, while subject to short term fluctuation, is not anticipated to change significantly over the ten year period.

Alberta Degrees By Field of Specialization

To compare supply to demand for specific occupations and occupational groups, it is necessary to tabulate the degree output in the province by area of specialization. The Statistics Canada[26] classification of graduates is altered slightly to conform to actual work performed which is the basis of the occupational group listing in The Canadian Classification and Dictionary of Occupations. That is, certain fields are removed from a particular category to another in order to fit into the appropriate major group of occupations. For example, Statistics Canada's Universities: Enrolments and Degrees includes commerce as a subspecialty under "Social Sciences." However, in the COFOR major groups, those occupations most frequently filled by business and commerce graduates are listed according to the actual work performed which is in major group 11: managerial, administrative and related occupations. Social science occupations include law, psychology, sociology, economics, social work, anthropology, geography and political science and constitute major group 23. Table 4.7 is a five year breakdown of Alberta degrees granted by field of specialization.

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[25] Statistics Canada, Advance Statistics of Education, 1981-82, Cat. # 81-220, Aug., 1981, p. 20.

[26] Statistics Canada, Universities: Enrolments and Degrees, Catalogue Number 81-204, Annual.

Although there were 37,501 degrees granted during the five years, this does not represent the number of new labor force entrants with university degrees. To calculate the supply available to the labor force, several factors must be considered.

1. The output of degrees granted from the universities subject to attrition.
2. The reserve pool of university-trained manpower who reside in the province but are not in the labor force. A certain percentage of this group enter or re-enter the labor force yearly.
3. An additional factor, mainly excluded from this research, is the university-trained migrants entering the province.

TABLE 4.7

ALBERTA DEGREES GRANTED* BY FIELD OF SPECIALIZATION, 1975-1979

Field	Degree	1975	1976	1977	1978	1979	Specialization Total	Yearly Average
Commerce	Bachelors	469	543	554	663	715	3229	646
	Masters/Doctorates	67	51	60	48	59		
Education & Physical Education	Bachelors	2209	2060	2265	2273	2354	12,681	2536
	Masters/Doctorates	280	298	311	315	316		
Fine and Applied Arts English	Bachelors	165	177	188	162	179	1060	212
	Masters/Doctorates	46	34	35	38	36		
Health	Bachelors	582	566	637	669	674	3265	653
	Masters/Doctorates	37	22	19	36	23		
Humanities[1]	Bachelors	137	141	91	87	103	841	168
	Masters/Doctorates	56	52	48	67	59		
Natural Sciences Engineering Mathematics	Bachelors	1045	985	1110	1214	1253	6939	1388
	Masters/Doctorates	242	298	287	274	231		
Religion	Bachelors	21	21	32	36	36	152	30
	Masters/Doctorates	1	1	1	2	1		
Social[2] Science	Bachelors	628	660	630	716	791	4302	860
	Masters/Doctorates	153	183	179	182	180		
No Specialization	Bachelors	1029	961	983	1038	1004	5015	1003
	Masters/Doctorates	0	0	0	0	1		

[1] Humanities: Excludes English and religious studies

[2] Social Sciences: Excludes Commerce *Excludes diplomas and certificates

Source: Statistics Canada, Universities: Enrolments and Degrees, Cat. No. 81-204, 1975-1979

University Output

Not all of the provincial university graduates are potentially available to the labor force. Therefore, a simple comparison of degrees granted from provincial institutions to COFOR demand estimates would not be a true supply-demand picture. However, there are now some data on graduates from which to estimate the university attrition ratio. In particular, the survey of 1976 graduates[27] can serve as a benchmark from which to calculate the numbers of Alberta university graduates who actually enter the labor market in Alberta. Although it is only a one-shot study and it would be preferable to have repeated surveys of postsecondary graduates, it is a comprehensive survey of fairly recent graduates. In Canada, it is the main document which illuminates the movement of graduates into the labor market.

Every year, each group of graduates from Alberta universities have certain people who do not proceed to seek employment in the Alberta labor force. They include:

1. Foreign students. These are the non-landed immigrants on student visas, otherwise referred to as student visitors. Foreign students were excluded from the Statistics Canada survey of 1976 graduates. However, a fairly consistent percentage of enrolments at the two largest universities in Alberta have been foreign students over the 1970 decade. From a high of 6.7 percent in 1975-76, approximately 5.3

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[27] Statistics Canada, Labor Market Reality for Postsecondary Graduates, March, 1981.

percent of U. of Calgary and U. of Alberta students combined were student visitors in 1979-80.[28] It is assumed that a similar ratio would apply to the number of degrees granted. The estimate used here is 6 percent of Alberta graduates are foreign students returning to their home country.

2. Interprovincial migrants. Of the 1976 graduates receiving degrees in Alberta, 10.2 percent were Canadians interviewed in other provinces of Canada in June, 1978.[29] That is, 89.8 percent of Alberta degree output were interviewed in the province. It is assumed that included in the 10.2 percent who leave are graduating students from other provinces returning home and Albertans who have accepted employment in other provinces.
3. Moved outside Canada. A fairly large number of Alberta 1976 graduates (the largest among the nine provinces in the survey) moved outside Canada, 7.8 percent. This represents 7.8 percent of all graduates whose residence was known and is thus likely to be understated. There were 2.6 percent of Alberta graduates in the "residence unknown" category. Some of these probably live outside Canada. Therefore, approximately 8 percent of graduates are estimated to be in the "moved outside Canada" group for present purposes.

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[28] University of Alberta, Data Book, p. 10, University of Calgary, Fact Book, p. 67.

[29] Statistics Canada, "Employment of 1976 University and College Graduates," p. 19.

4. Not looking for a job. These are graduates who because of illness, family responsibility, going to school, no interest or other reasons are not seeking employment. Among 1976 Alberta graduates, 12.8 percent were not looking for a job one month after graduation. This percentage was reduced to 8.4 percent over the two year interval between graduation and interview but the earlier figure is adopted because it would include more students continuing on in university in graduate, diploma or professional programs.

Although the above percentages require regular review and further research, they are adopted as realistic estimates of the current trends. If the total of the Alberta graduates NOT available for entry to the Alberta labor force is subtracted from the total degree output,* the resulting figure is the new supply from Alberta universities to the labor force. Expressed as percentages in Table 4.8, in a given year an estimated 63 percent of the degree output in Alberta enters the Alberta labor force (those working or seeking employment one month after graduation). For the four reasons listed, approximately 37 percent of the Alberta degree output does not proceed directly to the Alberta labor force.

It is suggested that the above estimates are subject to revision with continuing research. However, it is currently reasonable to calculate the yearly degree supply to the labor force at a ratio of .63 to provincial degree output. That figure will be adopted for the

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* Statistics Canada does not count heads for degrees granted. Instead, they tabulate the number of degrees awarded. Thus, there is a possibility of double counting when students are awarded more than one degree in a year.

TABLE 4.8

SUPPLY OF ALBERTA DEGREE OUTPUT TO THE ALBERTA LABOR FORCE-RETENTION RATE

		Percent
NUMBER OF DEGREES GRANTED		100
	Less	
1. Foreign Students	6.2	
2. Interprovincial Out-Migration	10.2	
3. Moved Outside Canada	8.0	
4. Not Looking for Job (one month after graduation)	12.8	
	37.0	
ATTRITION RATE		37.0
Supply as a Percentage of Degrees Granted* Retention Rate		63.0

*Excludes diplomas and certificates granted from universities.

supply-demand comparisons throughout this chapter.

Reserve Manpower Pool

In Alberta there is a large group of university graduates who are not part of the labor force. When conditions are favorable to these graduates, many enter or re-enter the labor force. It would appear that more graduates elected to join the Alberta labor force during the period between 1975 and 1980. The participation rate for graduates rose from 82.4 percent in 1975 to 85.5 percent in 1980. That is, a higher percentage of the university educated population became participants in the labor force in 1980. While The Labor Force gives regular provincial estimates about the size of this reserve manpower pool, two problems remain unsolved. In the first place, it is not possible to segregate those trained in Alberta institutions from the reserve pool to satisfy the requirement for provincial supply source only. Second, it is difficult to determine the numbers from this group who yearly enter or re-enter the labor force. In 1975, there were an estimated 17,000[30] university graduates who were not in the labor force. Since the Loken study, Projecting K-12 Teacher Supply and Demand in Alberta, adopted an estimate that 20 percent of the reserve pool made a decision to join the labor force at a later date, the same guess is used in this research. The re-entrants probably diminished annually between 1975 and 1980, however, since the degreed labor force increased at a much faster rate than did the reserve pool of graduates. That is, either higher demand or economic necessity appeared to be diminishing reserves over time. In 1975, it is guessed that approximately 3400 (20%) of the graduate reserves entered the labor force and that this number diminished by about 10 percent annually. No attempt is made to estimate the Alberta educated members of this group. The distribution of the re-entrants across disciplines is assumed to be proportionate to their numbers at graduation. For example, education graduates represent 34 percent of all graduates as well as re-entrants.

Not in Managerial or Professional Occupations

Finally, not all people with university degrees enter highly qualified occupations. Many find employment in sales, clerical or other occupations. Roughly one third of the degree graduates from the 1976 survey[31] were not in the major groups listed in Tables 4.3 and 4.4. The 1973 Highly Qualified Manpower Survey[32] found that a smaller proportion, roughly 20 percent, of young graduates were in sales, clerical or other occupations. The figure adopted for use here is that 70 percent of degree graduates move into managerial-professional occupations.

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[30] Statistics Canada, The Labor Force, Annual Averages, 1975 (December, 1980), p. 22.

SUMMARY OF SUPPLY FACTORS

To calculate the supply of Alberta degree holders into the major groups of occupations listed in Tables 4.3 and 4.4 would require the following formula:

$$\text{ALBERTA SUPPLY} = .63 \text{ A.D.G.} + .20 \text{ RP (diminishing 10\% annually)} \times .70 \text{ M.P.}$$

Where: A.D.G. = Alberta Degrees Granted
R.P = Reserve Pool of Degree Holders
M.P. = Managerial-Professional segment of the labor force estimated to be 70 percent of labor force entrants with university degrees.

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[31] Job Market Reality for Postsecondary Graduates, p. 381.

[32] Statistics Canada, Science and Culture Division.

ALBERTA SUPPLY AND DEMAND FOR MANAGERIAL-PROFESSIONAL MANPOWER

The main objective of this section is to compare the supply calculated according to the aforementioned formula to the demand estimates emanating initially from the first COFOR 1975-1982 (Table 4.3). Table 4.9 provides such a comparison. Some explanatory statements about this table are necessary. In the first place, the data are averaged yearly for both supply and demand. This is done to limit the time frame from 1975 to 1979, the last year when graduations from Alberta universities have been published by Statistics Canada. Although the COFOR estimates are averaged in Table 4.9, it should be remembered that the model was designed to cover a seven year interval, recognizing that there are year to year fluctuations and variations in demand.

Column 1 in Table 4.9 presents average yearly requirements, the sum of expansion demand and replacement demand (see Table 4.3). Columns 2, 3 and 4 represent supply. In column 2, the university degree output is subject to the aforementioned retention ratio. The listed figures are the supply available to the labor force after attrition. Allowance is made for the fact that approximately 70 percent of the labor force entrants with university degrees enter the managerial-professional occupational categories. Column 3 is the estimated reserve re-entrants (20% of the reserve pool, diminishing 10% annually, multiplied by .70). Column 4 is the sum of 2 and 3.

The final column, 5, is the average yearly supply-demand imbalance or supply minus demand. A negative number implies a supply shortage, a

TABLE 4.9

AVERAGE YEARLY ALBERTA SUPPLY AND DEMAND FOR MAJOR GROUP OF MANAGERIAL-PROFESSIONAL OCCUPATIONS, 1975 - 1979

C.C.D.O. CODE	Occupational Categories	1 Demand (Employment) COFOR (1976) Averaged Yearly 1975-1979	2 SUPPLY U. Degree Output Available to the Labor Force	3 Reserve Re-entrants	4 Total Supply (2+3)	5 Yearly Supply-Demand Imbalance (4-1)
11	Managerial Administrative	3183	709	327	1036	-2147
21	Natural Sciences Engineering Mathematics	1925	612	392	1004	- 921
23	Social Sciences	673	379	218	597	- 76
25	Religion	93	13	9	22	- 71
27	Teaching	1968	1118	741	1859	- 109
31	Medicine and Health	3734	288	203	491	-3243
33 37	Arts and Recreation	571	94	57	151	- 420
TOTAL ALL CATEGORIES		12,147	3213	1947	5160	-6987

Source: See Tables 4.3 and 4.7
See text for explanatory notes

Rounding may affect totals.

positive number indicates a supply surplus.

The supply in Table 4.9 is adapted to correspond to the occupational categories from The Canadian Classification and Dictionary of Occupations, that is, on the basis of work performed. This is done to correct the problems encountered in matching university output to C.C.D.O. Code 11, managerial and administrative occupations. Along with commerce and business programs which are directly related, some graduates from all other occupational categories actually do managerial and administrative work. Included in C.C.D.O. Code 11 are managers and administrators of teaching, medicine and health, engineering, social science and other fields. Not all occupational groups, however, seem to require the same percentage of administrators. For example, while 15 percent of social scientists are often engaged in managerial and administrative work, only 2.7 percent of those in medicine and health work as administrators.[33] To get around the problem of this very general category which cross-cuts other fields, it was decided to use an estimate derived from The Job Market Reality for Postsecondary Graduates. Among 1976 Alberta university degree graduates who were employed full-time in 1978, 6.8 percent found senior and middle management occupations and 8.1 percent were employed in management support occupations, (accountants, auditors, financial and personnel officers, etc.)[34] Therefore, roughly 15 percent of labor force entrants with degrees are assumed to enter C.C.D.O. Code 11 and the latter supply figure for degree output in column 2, averaged yearly at 709, constitutes that 15 percent. To avoid some double counting, commerce degrees are subtracted from the social sciences category. The majority of 1976 commerce graduates obtained jobs in C.C.D.O. Code 11.[35] Reserve re-entrants to C.C.D.O. Code 11 also represent 15 percent of total re-entrants.

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[33] These figures are derived from The Job Market Reality for Postsecondary Graduates and represent the 1976 graduate distribution in managerial-administrative positions.

[34] The Job Market Reality for Postsecondary Graduates, p. 97.

Because C.C.D.O. Code 33, arts and recreation, includes writers and editors, English majors are included in this supply category. In addition, religion is segregated from humanities as a separate category to correspond to C.C.D.O. major group categories.

In summary, in Table 4.9 supply of managerial-administrative is 15 percent of all graduates subject to .37 attrition and 15 percent of all re-entrants. Commerce graduates are excluded from the social sciences, English majors are included in arts and recreation and religion is treated as a separate category. Degree output has a retention ratio of .63 and all the supply with the exception of the managerial-administrative category is multiplied by .70 since 70 percent of the degree output is assumed to enter the listed occupational categories.

Based on what has been described as an overly-conservative COFOR 1975-1982 projection published in March, 1976 there were, nonetheless, estimated supply shortages in all major groups of managerial-professional occupations. If all Alberta vacancies were to be filled by Alberta university degree graduates with the appropriate majors, there is a total annual average shortage of 6,987 university degree recipients. Some fields show greater shortages than others. Natural sciences, engineering and mathematics (Code 21) and teaching show similar yearly requirements. However, the supply of teachers from university as well as re-entrants to the labor force is much higher as demonstrated in Table 4.9.

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[35] Ibid., p. 165.

The health and medicine field appears to have an acute shortage of 3243 graduates per year. There are two explanations for this large gap. In the first place, the COFOR 1975-1982 forecasts gave very high projected growth to major group C.C.D.O. Code 31. It was anticipated that 26,137 new health recruits would be needed between 1975 and 1982, a 71 percent increase. That projected requirement has subsequently proven to be somewhat inflated. A second reason for the yearly shortfall of medical recruits in Table 4.9 is the fact that only university graduates are included. While the universities constitute the exclusive training ground for physicians, dentists, medical researchers and pharmacists, they do not graduate as many nurses as do colleges. Therefore, the supply shortage would be reduced with the inclusion of nurses trained outside of the universities. Alberta colleges do not graduate enough health specialists, however, to eliminate the supply shortage in medicine and health. In those major groups of occupations which are primarily filled by only university graduates, such as teaching, the same problem in estimating total supply does not surface.

When there are small supply-demand imbalances such as in the social sciences and religion, caution should be exercised in the interpretation. In the first place, the supply here employed is limited to university graduates while a large alternate source of graduates may create a surplus. Second, there is a transfer or movement of graduates among highly qualified disciplines. For example, not all education graduates become teachers. Some obtain jobs in other managerial-professional occupations. This interdisciplinary movement could alter particular categories but not the total imbalance. Finally, this analysis segregates students by appropriate field of training. Those graduates with no designated specialization as well as some humanities graduates are excluded. If the latter were to be added to Table 4.9 an additional yearly average of 516 graduates (see Table 4.7) are available to the highly qualified labor force although it is difficult to determine in what occupations. Thus, although a total imbalance of 6987 is shown in Table 4.9, this can be reduced by 516 to produce a total imbalance of 6471.

Since the people preparing the forecasts felt that the 1975-1982 COFOR understated requirements for Alberta, it would be useful to examine the same 1975 to 1979 period by using both COFOR forecasts. The same supply figures used in Table 4.9 are used in Table 4.10. However, demand is calculated by citing the 1975 COFOR employment figures along with the 1979 base year figures from the 1979-1985 COFOR runs. That is, demand is the difference between the 1975 base year in the earlier COFOR and the 1979 base year in the COFOR 1979-1985. Since the Canada Department of Employment and Immigration only released the most recent projections in January, 1981, it is assumed that the full impact of the 1970 decade energy-related and demographic changes in Alberta were then apparent to planners. Therefore, the employment for the year 1979 (COFOR 1979-1985) should reflect more accurately how the various major groups of highly qualified occupations have been affected by the economic changes

TABLE 4.10

AVERAGE YEARLY ALBERTA SUPPLY AND DEMAND FOR MAJOR GROUPS OF MANAGERIAL AND PROFESSIONAL OCCUPATIONS, 1975-1979

		1	2	3	4	5	6	7	8	9
		EMPLOYMENT				DEMAND			SUPPLY	
CCDO CODE	Occupational Categories	COFOR[1] 1975	COFOR[2] 1979	Total Expansion Demand (2 - 1)	Total Replacement Demand (Deaths Withdrawals) 1975-1979[3]	Total 1979 (3+4)	Percentage of 1975 (5÷1)	Yearly Average	Yearly Average[4]	Yearly Average Supply-Demand Imbalance (8 - 7)
11	Managerial Administrative	32,030	48,595	16,565	5,949	22,514	70.29	5,629	1,036	-4,593
21	Natural Science Engineering Mathematics	23,612	40,265	16,653	3,070	19,723	83.52	4,931	1,004	-3,927
23	Social Sciences	7,131	9,590	2,459	962	3,421	49.97	855	597	- 258
25	Religion	1,847	2,040	193	363	556	30.10	139	22	- 117
27	Teaching	30,996	44,330	13,334	4,273	17,607	56.80	4,402	1,859	-2,543
31	Medicine and Health	36,614	44,005	7,391	4,636	12,027	32.85	3,007	491	-2,516
33	Arts and Recreation	6,033	9,405	3,372	654	4,026	66.73	1,007	151	- 856
TOTAL ALL CATEGORIES		138,263	198,230	59,967	19,917	79,874	-	19,970	5,160	-14,810

Sources: [1] Table 4.3, Column 1

[2] Table 4.4, Column 1

[3] Table 4.3, Column 4 averaged yearly (÷ 7 x 4).

[4] Table 4.9, Column 4

Explanatory notes in text. Rounding may affect totals.

in Alberta during the past decade.

Table 4.10 demonstrates the same trends as Table 4.9 but the supply shortages in most fields are much greater. The average annual shortage is 14,810, more than double what the earlier forecast had projected. In only one area, medicine and health, did the estimated supply shortage diminish. To reiterate, the original projection appeared to be inflated. Medicine, like teaching, is more directly influenced by demographic than economic changes. The projected shortage in medicine and health in Table 4.10 is close to the projected average annual teaching shortage. Both are most likely the result of rapidly increasing population through in-migration while the provincial supply has been relatively more stable.

When specific occupational categories are taken into consideration, there are some very accelerated expansion demand (growth) figures in Table 4.10. C.C.D.O. Codes 11 and 21 indicate a total (1975 to 1979) growth of over 16,000 jobs in each category. This is largely a reflection of the resource development in the province. More managers, engineers and related occupations were in higher demand because of energy projects in Alberta over the 1970 decade and those anticipated for the 1980s. The potential impact of these economic changes on the managerial, administrative, engineering, natural science and mathematics occupations was not fully incorporated.

Similarly the impact of demography on teacher demand was not anticipated in 1975. The earlier projections apparently did not adequately divorce the provincial from the general federal trends. The estimated average yearly demand for teachers during the last half of the 1970 decade remained high, much higher than the estimated Alberta supply to the labor force. Net migration to Alberta proved to be an offsetting factor to the general decline in the school-age population. An important point to remember about C.C.D.O. Code 27, teaching, is that universities are the prime training ground for teachers. Although some Letters of Authority are still granted,[36] a university degree is the usual prerequisite for teaching in Alberta. Therefore, teacher supply, as calculated in Table 4.9 and Table 4.10, is a fairly complete estimate of Alberta teachers available to the labor force who have obtained their university degree in the field of education. This analysis makes no attempt to explore the numbers of graduates who accept jobs in highly-qualified occupational categories that are different from their field of specialization in university. In addition, there are diplomas and certificates granted yearly which have been excluded from the university output in this section. However, over the time period in question, there has been a large decrease in the numbers of diplomas and certificates awarded yearly from Alberta universities, from 855 in 1975 to 237 in 1979.[37] Nevertheless, between 63 and 84 percent (a yearly average from 1975 to 1979 inclusive of 72 percent) of these certificates and diplomas were awarded in the field of education. These graduates, subject to attrition, would tend to slightly reduce the teaching supply shortages recorded in Table 4.10.

Teaching was the area which showed the greatest percentage increase in shortages between one forecast and the next. The 1975-1982 COFOR

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[36] Loken, p. 71. During the 1970 decade a yearly average of 298 Letters of Authority were issued in Alberta.

[37] Statistics Canada, Universities: Enrolments and Degrees, Cat. #81-204, 1975 to 1979.

(Table 4.9) indicated a supply shortage of 109 teachers annually over the forecast period. When the 1975 and 1979 (COFOR 1979-1985) base years are compared in Table 4.10, the teaching shortage had mushroomed to over 2,500 annually employing the same methodology and the same supply figures.

Again, caution should be exercised in interpreting small supply shortages such as those in religion and social sciences. There are several reasons for such caution. In the first place, there could be inaccuracies in the estimated data: the demand, the estimated attrition of university graduates to the labor force and the estimated number of reserve re-entrants into particular fields. In addition, some of the positions in religion and social science are undoubtedly filled by non-university graduates. The supply in Table 4.10 is the estimated available supply from Alberta universities only. Therefore, where a small imbalance (either shortage or surplus) occurs it is possible that it is not apparent in the labor market. There may not be many social science jobs advertised as vacant, for example, although yearly shortages in supply are forecast. Migration to the province also increases the supply to the highly qualified labor force although the attempt in this research is to relate provincial supply to provincial demand.

SUMMARY OF MAJOR GROUPS OF MANAGERIAL AND PROFESSIONAL SUPPLY AND DEMAND

If all Alberta highly qualified job vacancies were to be filled only by Alberta university graduates from the appropriate fields of specialization, subject to attrition, then an estimated large, annual, total shortage existed between 1975 and 1979 and the same general trend is expected to persist until 1985. When the 1975-1982 COFOR model for Alberta is examined, it appears that the economic forecast for the province, and the ultimate impact on highly qualified employment, were too conservative. Although most major groups of occupations were anticipated to undergo a fairly rapid growth, the more recent COFOR model (1979-1985) was released to more accurately record the energy-related and demographic changes of the 1970s. When the forecasts' two base years are compared, as in Table 4.10, employment growth between 1975 and 1979 is very high. Expressed as the 1979 percentage increase in employment since 1975, growth for the seven major groups of occupations ranged from 30.10 percent for religion to 83.52 percent in the natural sciences, engineering and mathematics (C.C.D.O. Code 21).

The supply available to the Alberta labor force from the universities in Alberta varies according to field of specialization. The largest annual supply shortages in round numbers were in C.C.D.O. Codes 11 and 21, managerial-administrative, natural sciences, engineering and mathematics followed by teaching and medicine and health. The arts and recreation also show large Alberta supply shortages particularly in light of the relative size of total employment and annual supply to that field. No significant alteration in these trends is expected up to 1985 as indicated by Table 4.6. Although there are shifts in enrolments in particular specializations, they are insufficient to substantially alter the supply shortages. Because of the lag period from freshman to graduation, those faculties which began to increase in 1980 would show a rise in graduates after 1983. This would merely counterbalance the decline in output during the 1980 to 1983 period caused by the drop in many faculty enrolments during the last three years of the 1970s. In most disciplines, supply to the labor force is thus expected to be comparatively stable between 1975 and 1985. One area which showed a large fluctuation in enrolment was education. During the latter part of the 1970s, enrolment declined by over 2000 students in Alberta. Output from this faculty would decrease in the early 1980s as a result. At the very time that shortages seemed to be increasing, 1979, enrolments were dropping. It would appear that students were either unaware of the job opportunities or were otherwise unresponsive to them.

In summary, increasing job opportunities did not appear to attract additional students into the areas where large shortages were apparent. Although the general economic law has been that people act in their own best interests, other factors obviously intervene. Ignorance of the state of the labor market as well as institutional policy geared to limiting enrolments are possibly as important as economic supply and demand in determining these observed trends.

ALBERTA SUPPLY AND DEMAND FOR SELECTED OCCUPATIONS

The general trends in supply and demand for highly qualified manpower can be obtained by looking at major groups of occupations. In the last section, then, an analysis of shortages or surpluses across broad occupational groups was the focus. However, this kind of analysis does not reveal the situation in specific occupations. While general shortages are estimated for certain occupational groups, it may well be that some specific occupations within that group are experiencing surpluses.

The focus is now shifted to specific occupations. The selected occupations are from different major groups (the first two numbers of an occupational C.C.D.O. Code always identify the major group). No subdivision of C.C.D.O. Code 27 (teaching) is made since all included have their main activities related to teaching. The divisions are based on the institutional levels rather than the work performed.

The supply to each of the occupations listed in Table 4.11 is subject to the same retention ratio (.63) as were the major groups of occupations. However, the reliability of this ratio across every occupation is questionable. It is used because some attrition is observable in every occupation. Available data do not permit an accurate attrition ratio for each occupation. For example, it is not known which occupations have the most members who leave Canada. Perhaps physicians and surgeons have the smallest number of members not seeking a job while, on the other hand, they have the largest percentage moving outside Canada. This suggestion is purely speculative. However, some general statements

TABLE 4.11

AVERAGE YEARLY ALBERTA OCCUPATIONAL SUPPLY AND DEMAND FOR SELECTED OCCUPATIONS, 1975 - 1979

CCDO CODES	Occupations	1 Requirements[1] Average Yearly Demand 1975 - 1979	2 Supply[2] Average Yearly Degree Output With Appropriate Specialization	Average Yearly Supply-Demand Imbalance 1975-1979 (2-1)
1171	Accountants Auditors Financial Officers	915	407	- 508
2111	Chemists	38	34	- 4
2112	Geologists	196	65	- 131
2113	Physicists	3	27	+ 24
2142- 2154	All Engineers	449	292	- 157
2181	Mathematicians Statisticians Actuaries	16	41	+ 25
2183	Systems Analysts Computer Programmers Related Occupations	112	52	- 60
2311	Economists	24	70	+ 39

TABLE 4.11 Cont.

AVERAGE YEARLY ALBERTA OCCUPATIONAL SUPPLY AND DEMAND FOR SELECTED OCCUPATIONS, 1975 - 1979

CCDO CODES	Occupations	1 Requirements[1] Average Yearly Demand 1975 - 1979	2 Supply[2] Average Yearly Degree Output With Appropriate Specialization	Average Yearly Supply-Demand Imbalance 1975-1979 (2-1)
2313	Sociologists	1	35	+ 34
2341- 2343	Judges Lawyers	184	103	- 81*
3111	Physicians and Surgeons	410	175	- 235*
3113	Dentists	111	29	- 82*
3151	Pharmacists	88	57	- 31
3352	Writers and Editors, Publication	103	44	- 59

[1] COFOR 1975-1982, averaged yearly.

[2] Supply is degree output subject to .63 retention ratio. See Table 4.7.

*Likely to be a slightly overstated shortage because of a probable lower attrition rate from graduation to the labor force.

can be made which clarify attrition trends. While there are generally some non-Albertan students in all faculties in Alberta universities, there are more in arts, commerce, education, engineering, science and pharmacy than there are in law, medicine and dentistry. In addition, the number of graduates not seeking employment one month after graduation varies by occupation or field of specialization. Fewer students graduating with first professional degrees than with other bachelor's degrees tend to continue on to graduate programs suggesting that more would move directly into the labor force. The fact that male labor force participation rates[38] are higher than female participation rates would also indicate that male-dominated fields of specialization would have more graduates seeking employment after graduation. When all of these factors are considered, one can roughly estimate whether or not a selected occupation deviates in a particular direction from the mean attrition rate. Thus, the .63 retention ratio may be reasonably accurate when applied to all fields of specialization but the reader should be aware of the fluctuation in attrition from occupation to occupation.

Excluded from Table 4.11 is an estimate of the re-entrants from the reserve pool of manpower not in the labor force. It is felt that in certain occupations there would be very few reserve re-entrants, if any. The fact that university graduates have recently shown increased participation in the labor force suggests that those occupations in very high demand and/or with longer than average university training are likely to have the vast majority of their members in the labor force.[39] In other occupations, re-entrants would constitute a larger group and supply would be underestimated.

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[38] Statistics Canada, The Labor Force, Yearly Averages, Dec., 1975-1979.

Also excluded from the supply to individual occupations is any calculation of the numbers of graduating students who do not enter the managerial-professional segment of the labor force. For the major groups it was estimated that approximately 70 percent of university graduates enter the managerial-professional occupations.[40] However, it is impossible to estimate how many from specific disciplines do or do not enter this segment. It is likely that certain fields of specialization lose large numbers to the non-managerial-professional occupations while others lose few or none.

The supply-demand imbalances for selected, individual occupations are contained in Table 4.11. As with the earlier data, a positive number implies a supply surplus while a negative number is indicative of a supply shortage.

Accountants, auditors and financial officers (C.C.D.O. 1171) are the occupations selected from major group 11. This field would mainly be the destination of commerce and business graduates. Of all the isolated occupations, the largest shortage of Alberta university graduates in absolute numbers is estimated to occur in this particular area. In order for Alberta supply to meet Alberta demand, the number of yearly university graduates would nearly have to double.

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[39] In The Job Market Reality for Post-Secondary Graduates such was the case. Fewer graduates with a long period of training and in fields with plentiful job opportunities declared that they were not looking for work if they were not already employed.

[40] Ibid., p. 381.

Although major group 21 was an area where supply shortages were great, not all occupations within the science-mathematics field share this feature. Geologists, engineers and computing science occupations (C.C.D.O. Codes 2112, 2142-2154 and 2183 respectively) were fields in high demand in Alberta between 1975 and 1979. On the other hand, it appears that there was an estimated labor market surplus of physicists and mathematicians during the same period. In addition, the supply-demand situation in the field of chemistry was close to balanced. Average yearly demand for physicists and mathematicians is low while a moderate and consistent supply of graduates from these fields enter the labor market yearly. One possible explanation for the surplus is an underestimation of the average yearly demand over the period. However, this appears unlikely when the latest 1979-85 COFOR is examined. The same general trends are evident. While the earlier forecast underestimated the general demand for the natural sciences, engineering and mathematics, the areas of underestimation are geology, engineering, systems analysis and computer programming. That is, the predicted shortages were much greater than the early estimates suggested. However, the surplus disciplines appeared to change little from one forecast to the next. Demand for engineers and geologists suggests an acute shortage.

An additional factor which may alter the findings is the transferability of fields of specialization in the market. Are there some graduates in a particular field able to obtain employment in alternate but possibly related areas? For example, is it possible that some of the surplus mathematics graduates may be able to obtain employment in systems analysis and computer programming occupations? This study makes no attempt to measure the degree to which graduates find employment in disciplines other than those in which they are trained.

The social sciences field is an area where there is projected low demand. This trend is reflected in the three occupations selected. Average yearly demand for sociologists was one additional person while over the five year period a consistent yearly supply of students graduated in sociology. Similarly, demand for economists was moderate with a relatively high output from universities over the five years. Here again, economics graduates may also be marketable in related disciplines. In Job Market Reality for Postsecondary Graduates, about one-third of the 1976 Canadian economics graduates obtained employment as senior and middle managers and in management support.[41] As a rule, however, the absorption of many graduates from the social sciences into the labor force is generally problematic because few of these disciplines are strictly career-oriented. Therefore, sociology graduates, like those in geography and political science, often end up in teaching or other occupations. Despite the lack of career-orientation, a large percentage of university freshmen regularly enter the social sciences.

Law is one social science discipline which is career-directed training. According to the 1976-1982 COFOR there was a shortage of judges and lawyers between 1975 and 1979 when university output is compared to COFOR demand. The stated shortage in Table 4.11 is likely to be exaggerated. The .63 percent retention rate (all of the supply figures have a 37 percent deduction because of attrition) for law may be too low. There are several reasons for this conclusion. Few out-of-province students enrol in law; few continue on to graduate school; it is a male-dominated profession with a tendency to greater labor force participation; and, since constitutional law varies from nation to nation, it is unlikely that many lawyers would seek employment outside of Canada. Therefore, it is probable that a greater percentage of law graduates than average move into the Alberta labor force.[42] The supply shortage listed in Table 4.11 is thus probably exaggerated.

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[41] Ibid., p. 213.

There would also tend to be a greater supply of physicians, surgeons and dentists than the average yearly Alberta supply in Table 4.11 suggests. For reasons similar to those cited for lawyers, attrition rates would probably be lower than average for these professions. The anticipated shortage of physicians and surgeons trained in Alberta is sufficiently large that if all graduates entered the Alberta labor force, the supply shortage would still exist. The provincial supply of pharmacists also points to a shortage in relation to COFOR demand estimates.

The category, "Writers and Editors, Publications" is included as the only occupation from the literary arts. Since there are no journalism schools in Alberta universities, the field of university training most appropriate to C.C.D.O. Code 3352 in Alberta is English. Supply in Table 4.11 is graduates of the humanities majoring in

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[42] Statistics Canada's Job Market Reality...suggests that possibly an 85 percent retention rate would be more appropriate to law graduates, Ibid., p. 216.

English. Demand for writers and editors was estimated to be fairly high between 1975 and 1979. As a result, there was a yearly shortage of English graduates to meet this demand. Of course, it is quite possible that English graduates would be a second choice for employers and that demand in Alberta is largely filled by candidates from schools of journalism in other provinces migrating to Alberta. Migrants are generally excluded from this research and are mentioned here only because English is technically not the most career-oriented program for those interested in careers in journalism.

In summary, particular occupations within major groups often deviate from the group trend. For example, in C.C.D.O. Code 21 there were acute estimated shortages of engineers (which also varied by subspecialty) and geologists but consistent surpluses in physics and mathematics. Chemists were close to a supply-demand balance.

The supply-demand imbalances for specific occupations were based on COFOR 1975-1982, which was replaced by the COFOR 1979-1985 in an effort to update what government officials felt was an overly conservative, underestimation of demand in Alberta. Table 4.12 presents the same methodology for relating specific occupational supply and demand with the exception that the demand estimates are from the COFOR 1979-1985. If Tables 4.11 and 4.12 are compared, the same basic trends emerge. The projections to 1985 present almost the same occupational shortages and surpluses as the earlier COFOR. Where discrepancies occur, it is usually a matter of degree rather than kind. That is, there is still an acute shortage of geologists and engineers predicted but the projected shortage is even worse than had been anticipated in the earlier COFOR. This probably reflects the cumulative affect of

TABLE 4.12

AVERAGE YEARLY ALBERTA OCCUPATIONAL SUPPLY AND DEMAND FOR SELECTED OCCUPATIONS, 1979 - 1985

CCDO CODES	Occupations	1 Requirements[1] Average Yearly Demand 1979-1985	2 Supply[2] Average Yearly Estimated Degree Output With Appropriate Specialization	3 Average Yearly Supply-Demand Imbalance 1979-1985 (2-1)
1171	Accountants Auditors Financial Officers	1177	407	- 770
2111	Chemists	20	34	+ 14
2112	Geologists	275	65	- 210
2113	Physicists	3	27	+ 24
2142- 2154	All Engineers	777	292	- 485
2181	Mathematicians Statisticians Actuaries	4	41	+ 37
2183	Systems Analysts Computer Programmers Related Occupations	131	52	- 79
2311	Economists	45	70	+ 25

TABLE 4.12 Cont.

AVERAGE YEARLY ALBERTA OCCUPATIONAL SUPPLY AND DEMAND FOR SELECTED OCCUPATIONS, 1979-1985

CCDO CODES	Occupations	1 Requirements[1] Average Yearly Demand 1979-1985	2 Supply[2] Average Yearly Estimated Degree Output With Appropriate Specialization	3 Average Yearly Supply-Demand Imbalance 1979-1985 (2-1)
2313	Sociologists	N.A.	35	N.A.[3]
2341- 2343	Judges Lawyers	362	103	- 259*
3111	Physicians Surgeons	276	175	- 102*
3113	Dentists	83	29	- 54*
3151	Pharmacists	152	57	- 95
3352	Writers and Editors Publication	98	44	- 54

[1] From COFOR 1979 - 1985, Averaged yearly.

[2] See Table 4.7. Supply is estimated degree output subject to .63 retention ratio.

[3] Computer error.

* Likely to be a slightly overstated shortage because of a probable lower attrition rate from graduation to the labor force.

shortages over a period of years in addition to an expanding demand because of megaproject construction in the province.

The supply figures used in Table 4.12 are the same as those in Table 4.11. By observing enrolment* trends in individual fields of specialization, it is apparent that no dramatic changes to 1985 can be anticipated in the number of graduates entering the selected occupations. The quota faculties of law, medicine and dentistry show small increases in enrolment with law leading the group. Engineering enrolments were gradually increasing after 1977-78 although not nearly enough to counterbalance demand. Commerce and business administration enrolments dropped from 1978 to 1980 but started to increase thereafter. Social science and humanities fields were slightly rebounding after enrolment declines to 1979-80. The same phenomenon was occurring in general arts and science programs. Projected shifts in total enrolment can be seen in Table 4.5. To summarize the enrolment picture for Alberta to 1985, a period of general decline in the late 1970s was followed by a recovery that began to be felt in most faculties. As a result of these trends, the output of degrees is expected to drop in the early 1980s and subsequently increase to 1985. Therefore, the average yearly output would not alter significantly between 1980 and 1985 from what it had been from 1975 to 1980. The variation in specific disciplines was not sufficient to greatly alter the number of graduates entering particular occupations up to 1985.

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*Refer to Chapter 3 for additional information on enrolment trends in Alberta universities.

SUMMARY AND CONCLUSIONS: OCCUPATIONAL SUPPLY AND DEMAND IN ALBERTA

One of the main purposes of this research is to determine if there is any apparent "feedback" effect from the labor market to the university. Do students base their decisions regarding programs in university on the state of the labor market? If so, one would expect a positive relationship. That is, when demand for a particular occupation is high, a subsequent increase in enrolment in the area would ensue.

One of the difficulties in attempting to demonstrate whether or not there is a relationship between market demand and student choice is the fact that other variables intervene. As was mentioned earlier, institutional policy and political issues largely shape the enrolment and labor market trends. With increasing numbers of restricted enrolment faculties, many qualified students are refused entry into faculties of their choice. The explanation behind much institutional policy touches on political and economic concerns. Political, social and economic support for universities seemed to peak during the expansionist period of the 1960s. In the 1970s there was a dampening of support. The relative proportion of government budgets devoted to higher education in general and universities in particular began to dwindle. Human capital theory, which treated investments in human capital as analogous to physical capital investments capable of yielding a positive rate of economic return, was no longer in vogue. As university graduates became more plentiful, it was apparent that investment in human capital did not necessarily bring higher economic returns either in private income to the individual or in national income. Moreover, during the seventies the spectre of economic recession hung over Canada. Problems of rising unemployment and interest rates along with rampant inflation seemed to elude easy solutions. The political and social climate in Canada began to swing to the right. In particular, the universities did not enjoy the same social support. As public opinion changed so did political support. More restraint in post-secondary financial allotment was noted. One of the spin-offs appeared to be more quota restrictions on particular faculties as well as more financial controls in most departments. In sum, the political, social, economic and institutional milieu changed during the 1970s.

Thus, it would be naive to view the current situation as a simple product of supply and demand shifts over time. Rather, it appears more correct to say that some feedback to the university from the labor market is suspected although there is no direct and consistent relationship between this particular supply and demand area. I suspect that the increased qualified applicants to engineering and business administration and commerce (ignoring the enrolment) is an indication that students are aware of the shortages in these fields in the market place. Similarly, increased applications to the quota faculties of medicine and law and the increase in enrolments in law between 1975-76 and 1979-80 also suggest that more students are choosing those occupations which have historically enjoyed a supply-demand balance. Since graduate studies and research remained a non-growth faculty for over a decade, it is reasonable to assume that students who formerly were destined for this area were responding to the decline in the academic labor market. Former postgraduate students may be counted among the increased qualified applicants to professional programs.

Enrolments in dentistry were stable between 1975 and 1980 in spite of estimated labor market shortages. Here again, the number of qualified applicants to dentistry increased while a quota of 50 students was still in place by 1979-80. Towards the end of the decade there was a drop in the percentage of qualified Alberta applicants admitted to the program.

Among those occupations listed in Table 4.11, pharmacy was an additional faculty where enrolments were stable over the last five years of the decade. It is an additional field in which qualified applicants generally exceed the number of admissions while manpower forecasts indicate a greater demand than supply in Alberta.

In all of the quota faculties, then, the number of qualified applicants is more likely to reveal any apparent student response to labor market conditions than are enrolments. Quota faculty admission statistics have only been recorded over the past three years. The Registrar's Office[43] reports, however, that student interest in the quota faculties increased during the latter half of the 1970s. All of the quota disciplines mentioned were also forecast to have moderate to high demand in the labor market during the same period. It would appear that student selection of an area of specialization may be influenced by perception of labor market opportunities for employment in that area.

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[43] Interview with Mr. Lorne Gunther, Student Liaison Officer, Registrar's Office, University of Alberta, Sept., 1981.

Nevertheless, evidence suggests that there is no direct and consistent relationship between enrolments in a particular field and the demand for that occupation in the labor market. For example, some of the arts, science and humanities specialties are in low demand in the labor market and have been for several years while enrolments in these departments have shown little change. In physics and mathematics there has been a fairly consistent yearly enrolment over the last few years while the COFOR forecasts (both 1975-1982 and 1979-1985) suggest that there has been a surplus in the supply to the labor market over the same time frame. Chemistry is an additional field with a very low demand but an enrolment pattern that has not significantly altered. Similarly, economics and sociology enrolments have fluctuated but have not shown any consistent downward spiral corresponding to the large estimated surpluses in the labor force. Economics enrolments actually grew between 1975 and 1980 when other arts and science enrolments were declining. It is possible, however, that the field of economics is transportable to other occupations. That is, economics graduates may also be marketable in alternate business, management, or auditing positions. If this flexibility is prevalent, there would be more demand for economists than this supply-demand analysis reveals. Sociology as a field has continually attracted far more students than there is estimated demand for sociologists. In the latter case, the drop in enrolments in 1975 was balanced by an increase again in 1976. Nor has there been a tremendous transfer of students into geology in response to a cumulative shortage of geologists in Alberta over several years.

Finally, C.C.D.O. Code 3352, "Writers and Editors, Publication," was selected from the arts field because the prime area of specialization, in lieu of a school of journalism, was English. Demand for writers and editors is high and local supply does not meet the demand. Nevertheless, there was a slight drop in English majors during the specific time frame outlined.

In conclusion, available evidence indicates that there is no direct and consistent relationship between enrolments in a particular field and the estimated demand for that occupation in the labor market. On the other hand, it is not contradictory to say that it appears that there is some response by students to perceived job opportunities in the labor force. What are the reasons for advancing these conclusions?

In the first statement concerning the inconsistent relationship, it appears that in certain fields, such as sociology, English, physics and chemistry, a given level of enrolment is maintained which does not relate to estimated shortages or surpluses in the labor market. That is, there is reason to believe that either students are not accurately informed about demand for a particular occupation or they will enter a field that they find interesting irrespective of labor market demand. What is unknown is the relative degree of influence of these intervening factors. Perhaps there is an information lag on the state of the labor market. By the time students become aware of surpluses or shortages in particular occupations, the situation has already changed. In the arts and science specializations, there is no quota restriction so that all qualified applicants are admitted.

In the second conclusion about some student response to the labor market, there has been an obvious shift in student choice (as measured by the number of qualified applicants) towards those faculties which have historically enjoyed ample job opportunities and excellent wages. Law and medicine top this list. In addition, the increased interest in engineering could be interpreted as a response to acute shortages about which students are informed through extensive media coverage. Less noticeable shifts in student choice which parallel labor market demand are the increased numbers of computing science majors relative to general mathematics majors.

Of course, the above discussion does not touch the possibility that the instrument used in this research (COFOR) may have limitations in terms of its precision in forecasting. As previously cautioned, there are probably some inaccuracies in the forecasts. In fact, it has been pointed out by those government employees working on COFOR that the earlier model's output was rendered prematurely obsolete due to rapidly changing economic conditions. For Alberta, the result tended to be an underestimation of demand in the COFOR 1975-1982. It is necessary to emphasize that the forecasts are not head counts of requirements but are designed to highlight occupational trends. Moreover, they are the only source of specific occupational forecasting.

As a general cross-check for precision, an introductory section of this chapter was based on the analysis of "professional-managerial, etc." occupational growth in Alberta from The Labor Force. When all highly qualified occupations are combined, The Labor Force data tends to conform to the COFOR forecasts. That is, based on the labor force surveys, the "professional-managerial etc." segment of the Alberta labor force actually was larger in the late 1970s than the conservative COFOR 1975-

1982 projections. In fact, The Labor Force totals are consistently higher than the COFOR totals for the highly qualified segment. Therefore, the shortages of qualified manpower listed in the foregoing tables would tend to be minimum estimates.

The Labor Force does not include, however, a breakdown of the numbers of workers in specific occupations or in major groups of occupations. One very rough cross-check of individual occupations can be had by scanning published job advertisements. If there are shortages in particular fields, one would anticipate that a larger number of jobs in that area would be advertised as vacant. A content analysis of the "Careers Journal" section of The Edmonton Journal over three months reveals that many trends outlined in COFOR are confirmed by the advertised vacancies. The four most common job vacancies advertised in the "Careers Journal" over the time period were engineers, accountants, systems analysts and geologists. Far more rare are advertisements, for example, calling for social scientists. The number of advertised vacancies in accounting and auditing occupations is very high relative to the need for economists. Of course, professional positions are often not filled via newspaper advertisements and a full picture cannot be obtained from this source. However, the available evidence lends support to the COFOR forecasts. In addition, by scanning newspapers for job advertisements, a more accurate picture of "real" shortages or surpluses may become apparent. Since this study excludes in-migrants to Alberta, it is impossible to determine to what extent interprovincial migrants alter the supply-demand imbalances in Tables 4.11 and 4.12. In fact, since Alberta Statistics and Statistics Canada do not record interprovincial migration by occupation, one would have to consult professional associations or other sources to attempt to determine the general educational background of interprovincial migrants.

In conclusion, all of the examined evidence points to high labor market demand in Alberta between 1975 and 1980. The growth in the professional-managerial labor force in Alberta was an anomaly in relation to the national labor market. These observations are all consistent with the world systems model. The forecasts to 1985 anticipate continued Alberta labor force growth relative to the remainder of Canada:

> Tenet 4: That demand for university trained manpower will remain high because of a growing economy, research and development activity and energy mega-project construction.

However, there was one unfulfilled expectation stated in tenet 6 of the world systems analysis. Neither educational participation rates nor actual enrolments in Alberta universities have substantially increased in response to the high labor market demand for university-trained manpower. As a result, general degree output from the universities was fairly stable between 1975 and 1979 and was anticipated to alter little before 1985. The fluctuations that did occur in specific areas of specialization were too small to have a large impact on supply-demand imbalances. Moreover, it was noted that some disciplines had a fairly stable enrolment over the period in question while there were either surpluses or large shortages of workers in these job-related fields in the labor market. Perhaps the one area where response to labor market conditions seems to be indicated is in the increased applications to those faculties or disciplines where graduates were enjoying plentiful job opportunities over the period in question.

Tenet 12 from the world systems model aptly describes some of the general findings from this analysis:

> That generally, in comparison with Canadian trends, all university trained manpower in Alberta will be in high demand subsequent to the beginning of the economic boom. That is, there should be no long term surplus of teachers in Alberta due to in-migration. Migrants tend to be young adults in the prime child rearing ages. Particular disciplines, such as engineers, geologists, petroleum geophysicists, accountants, business administrators and computer programmers are likely to remain in very high demand in Alberta due to the nature of the resource economy and the mega-projects that are planned.

SALARIES OF UNIVERSITY GRADUATES

It has generally been assumed that, by the law of supply and demand, if demand is great for certain graduates who are in short supply, salaries are also high and vice versa. It seems likely that an oversupply of graduates from a particular area of specialization would cause their competitive financial position in the labor market to deteriorate. As well, if starting salaries for certain graduates are high, one may expect that more students would be attracted into those disciplines in university. The objective here is to determine if there is any support for the above hypotheses. In addition, some regional and national comparisons are provided.

Turning to regional differences first, salaries for university graduates differ by province but not always in the expected direction. Statistics Canada's 1978 survey[44] turned up the somewhat surprising fact that Canadian university graduates earned the highest average salaries in the provinces of Newfoundland and Saskatchewan followed by Alberta. As Table 4.13 suggests, regional economic conditions are not the only factor producing varying wage rates for university graduates, at least not in this one-time survey. Alberta, however, did surpass the national average in incomes for recent university graduates and attracted the most graduate imports.

The June, 1978 Statistics Canada survey also revealed that starting salaries* for graduates varied widely by field of training. Moreover, those with the highest average incomes were not necessarily the people most satisfied with those incomes although usually higher paid disciplines showed less dissatisfaction with their wage rate. Tables 4.14 and 4.15 are reproduced from the study and show average annual salaries of 1976 graduates in 1978 by major fields as well as a rank order of salaries by field of specialization. Included in Table 4.15 are college graduates since the survey included both college and university graduates. The tables generally confirm the expected: that Master's and Ph.D. recipients are concentrated at the top of the wage scale while college graduates tend to be clustered at the bottom.

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[44] The Job Market Reality for Postsecondary Graduates, Cat. #81-572E.

The average full-time salary for university graduates in June, 1978 was $15,200, while it was $12,300 for college graduates.[45] Some college graduates, however, earned more than some university graduates. Dentists earned the highest average annual starting income, $27,000. Second to dentists in average wages were M.Ed and Ph.D. graduates in education, the latter surpassing graduates with the same level of education in the fields of mechanical engineering and business, management and commerce. The probable reason for the comparatively high salaries of education post-graduates lies in the age factor. Many with education degrees return to university graduate school after several years of teaching experience and thus are older. For example, some pursue a degree in educational administration in anticipation of

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*For present purposes, annual incomes of graduates with only two years or less of work experience are defined as starting salaries.

[45] Ibid., p. 137.

TABLE 4.13

AVERAGE SALARIES OF 1976 UNIVERSITY GRADUATES WHO WERE WORKING FULL-TIME IN JUNE, 1978, BY PROVINCE OF INTERVIEW AND QUALIFICATION LEVEL

Province of Interview		University Degree	
		Bachelor's	Master's or Ph.D.
Newfoundland	$	15,500	22,300
Prince Edward Island	$	12,800	19,000
Nova Scotia	$	13,100	18,400
New Brunswick	$	14,700	19,200
Quebec	$	14,800	21,800
Ontario	$	14,700	20,400
Manitoba	$	14,600	20,100
Saskatchewan	$	15,500	22,300
Alberta	$	15,200	21,300
British Columbia	$	15,200	20,400
TOTAL Canada	$	14,800*	20,600*

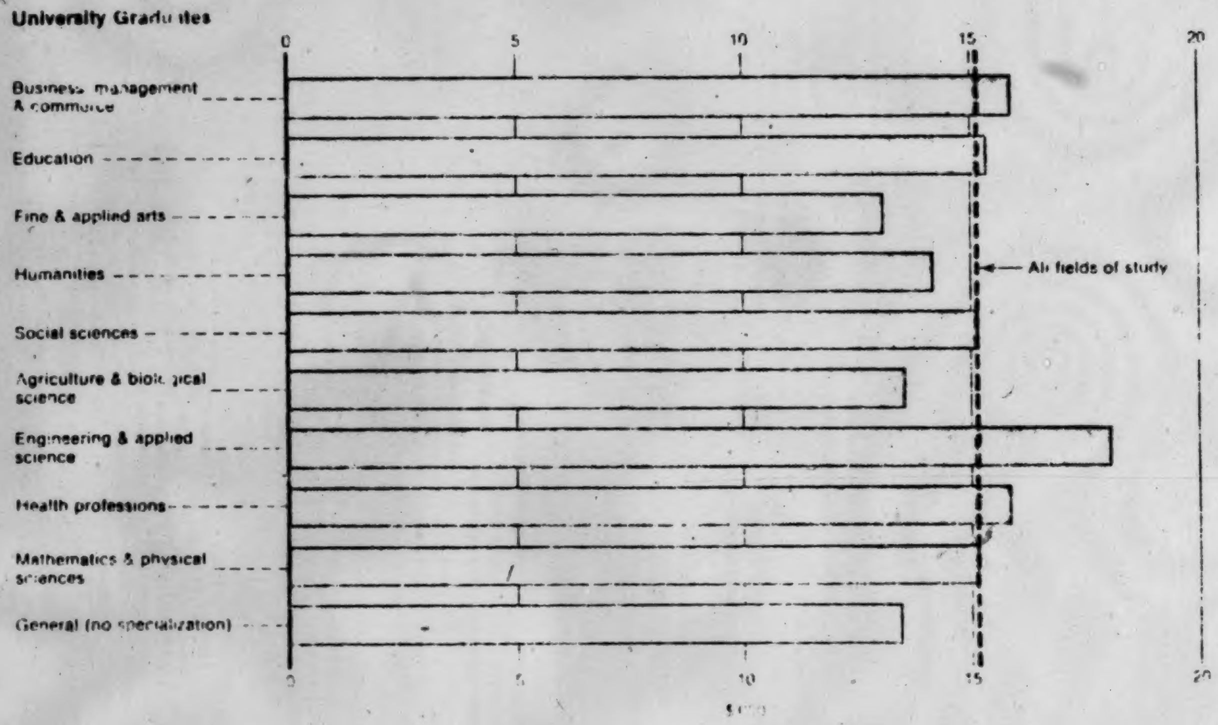
Source: Statistics Canada, The Job Market Reality for Post-secondary Graduates, Cat. #81 - 572E pp. 80-98.

*Rounding may affect totals.

an administrative post. Since experience usually raises salaries, there are probably more in education who have worked for more than one or two years prior to seeking advanced degrees. Another factor may be that certain careers have relatively low starting salaries but show rapid gains with experience. At the upper levels of experience, average annual salaries in different occupations may be widely divergent whereas during the first year on the job starting salaries were very similar. For example, among 1976 bachelor's graduates, starting

TABLE 4.14

AVERAGE ANNUAL SALARIES TWO YEARS AFTER GRADUATION, BY MAJOR FIELD OF STUDY, UNIVERSITY AND COLLEGE GRADUATES, JUNE 1978



Source: Statistics Canada, Job Market Reality for Postsecondary Graduates, Cat. # 81 - 572E, p. 138.

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TABLE 4.15

AVERAGE ANNUAL SALARY
(Rank order, by field of study, June 1978)*

Rank	Field of study	Certificate, diploma or degree	Average annual salary	% satisfied with salary
1	Dentistry	BACH	$27,000	--
2	Teacher training	M-PHD	$25,000	90.6
3	Mechanical engineering	M-PHD	$22,500	78.9
4	Business, management and commerce	M-PHD	$22,100	83.0
5	Civil engineering	M-PHD	$22,000	80.8
6	Miscellaneous engineering	M-PHD	$21,800	77.4
7	Electrical engineering	M-PHD	$21,400	74.7
8	Geography	M-PHD	$21,400	89.8
9	Chemical engineering	M-PHD	$20,900	67.3 Q
10	Geology	M-PHD	$20,800	95.5
11	Psychology	M-PHD	$20,800	79.5
		Average for all M-PHD = $20,600		= 86.2
12	Miscellaneous social sciences	M-PHD	$20,400	80.9
13	Mathematics	M-PHD	$20,000	79.3
14	Sociology	M-PHD	$19,900	74.1
15	Physical education	M-PHD	$19,700	86.3
16	Architecture	M-PHD	$19,700 Q	93.8 Q
17	Economics	M-PHD	$19,500	82.8
18	French	M-PHD	$19,300	81.6
19	Miscellaneous physical sciences	M-PHD	$19,200 O	81.2 O
20	Political science	M-PHD	$19,200	73.2
21	Chemical engineering	BACH	$18,700	77.4
22	Miscellaneous engineering	BACH	$18,500	80.8
23	Mechanical engineering	BACH	$18,400	75.0
24	Rehabilitation medicine	M-PHD	$18,400 Q	87.8 Q
25	Agriculture and miscellaneous biological sciences	M-PHD	$18,000	82.3
26	Civil engineering	BACH	$17,800	78.4
27	Social work	M-PHD	$17,800	78.1
28	Pharmacy	BACH	$17,700	81.4
29	Law	BACH	$17,300	86.9
30	English	M-PHD	$17,100	79.4
31	Electrical engineering	BACH	$17,100	86.6
32	Philosophy	M-PHD	$17,000	85.5 Q
33	History	M-PHD	$16,900	76.0
34	Physics	M-PHD	$16,700	83.8
35	Medicine	M-PHD	$16,500	74.8 O
36	Chemistry	M-PHD	$16,500	81.8
37	Forestry	BACH	$16,300	73.3
38	Medicine	BACH	$16,200	74.7
39	Fine and applied arts	M-PHD	$16,100	82.8 Q
40	Rehabilitation medicine	BACH	$15,800	80.2
41	Library and records science	M-PHD	$15,500	73.2
42	Mathematics	BACH	$15,300	82.1
43	Architecture	BACH	$15,200	80.4
44	Geology	BACH	$15,200	85.6
45	Teacher training	BACH	$15,200	87.1
46	Miscellaneous languages	M-PHD	$15,200	70.1 Q
47	Mass media studies	M-PHD	$15,100 Q	90.6 Q
48	Miscellaneous humanities	BACH	$15,100 Q	93.0 Q
49	Social work	BACH	$15,000	69.5
50	Miscellaneous health specializations	BACH	$15,000 O	94.7 O
51	Biology	M-PHD	$15,000	77.1
52	Business, management and commerce	BACH	$14,900	75.9
53	Household sciences	M-PHD	$14,900 Q	--
54	Data processing and computer science	3-4C	$14,900	88.9
		Average for all BACH = $14,800		= 81.3
55	Religious studies	BACH	$14,800	80.7
56	Nursing	BACH	$14,700	83.1

Continued...

*Employed full-time

Note: 1-2C = 1-2 year college certificate or diploma
3-4C = 3-4 year college certificate or diploma
BACH = Bachelor's or first professional degree
M-PHD = Master's or Ph.D.

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TABLE 4.15

AVERAGE ANNUAL SALARY
(Rank order, by field of study, June 1978)* - Concluded

Rank	Field of study	Certificate, diploma or degree	Average annual salary	% satisfied with salary
57	Geography	BACH	$14,600	84.2
58	Electronic and electric technologies	3–4C	$14,500	83.3
59	Chemical technologies	1–2C	$14,500	83.5
60	Physical education	BACH	$14,500	81.0
61	French	BACH	$14,400	85.6
62	Mechanical technologies	1–2C	$14,300	77.2
63	Sociology	BACH	$14,300	75.6
64	English	BACH	$14,200	80.8
65	Psychology	BACH	$14,200	79.7
66	Mechanical technologies	3–4C	$14,100	78.2
[illegible]7	Economics	BACH	$14,100	81.0
68	Transportation	3–4C	$14,000	64.0 O
69	Political science	BACH	$14,000	78 7
70	Miscellaneous social sciences	BACH	$13,900	81.1
71	Chemical technologies	3–4C	$13,800	70.3
72	Agriculture and miscellaneous biological sciences	BACH	$13,800	79.0
73	Household sciences	BACH	$13,800	80.1
74	Miscellaneous engineering and related technologies	1–2C	$13,700	79.9
75	Electronic and electric technologies	1–2C	$13,700	75.7
76	History	BACH	$13,600	80.2
77	Miscellaneous engineering and related technologies	3–4C	$13,600	82.2
78	Primary industries	3–4C	$13,500	82.6
79	Transportation	1–2C	$13,400	69.4
80	Miscellaneous medical and dental services	3–4C	$13,400	75.5
81	General (no specialization)	BACH	$13,400	78.5
82	Nursing	3–4C	$13,400	67.5
83	Physics	BACH	$13,300	80.4
84	Data processing and computer science	1–2C	$13,200	81.8
85	Miscellaneous languages	BACH	$13,200	75.4
		Average for all 3–4C = $13,100		= 74.9
86	Primary industries	1–2C	$13,100	81.4
87	Mass media studies	BACH	$13,100	89.5
88	Business, management, and commerce	3–4C	$13,100	81.7
89	Fine and applied arts	BACH	$13,000	81.2
90	Biology	BACH	$12,900	79.6
91	Philosophy	BACH	$12,800	94.7
92	Nursing	1–2C	$12,800	76.3
93	Architecture	3–4C	$12,700	78.4
94	Chemistry	BACH	$12,700	75.5
95	Miscellaneous medical and dental services	1–2C	$12,400	73.8
96	Architecture	1–2C	$12,300	74.1
97	Business, management, and commerce	1–2C	$12,100	76.7
		Average for all 1–2C = $12,100		= 74.3
98	Mass communications	3–4C	$11,400	78.9
99	Religious studies	M–PHD	$11,300 O	79.7 O
100	Community service and social welfare	3–4C	$11,300	67.4
101	Mass communications	1–2C	$11,300	64.8
102	Community service and social welfare	1–2C	$11,000	68.6
103	Graphic arts	1–2C	$10,800	59.3
104	Graphic arts	3–4C	$10,600	64.7
105	Commercial design	3–4C	$10,100	48.1 Q
106	General arts and science, education, law	1–2C	$10,100	65.8
107	General arts and science, education, law	3–4C	$10,000	72.8
108	Miscellaneous fine, applied, and performing arts	3–4C	$10,000	64.0
109	Commercial design	1–2C	$10,000 Q	86.8 Q
110	Secretarial arts and science	3–4C	$9,200 Q	--
111	Secretarial arts and science	1–2C	$9,100	77.9
112	Miscellaneous fine, applied, and performing arts	1–2C	$9,100	54.0

*Employed full-time

Source: Statistics Canada, Job Market Reality for Postsecondary Graduates, Cat. # 81 - 572E, pp. 139-140.

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salaries for teachers were higher than those for commerce graduates and were about one thousand dollars per year less than the average for graduates in medicine. Income tax data suggest that as time progresses the gap between these various career income averages widens.

Do the results of Statistics Canada's 1978 study support the law of supply and demand? That is, do graduates in short supply and great demand earn the highest incomes and vice versa? When the salary tables are related to the foregoing estimates of supply and demand imbalances, there is moderate support for the law. It appears that, with some exceptions, in those occupations in which supply falls considerably short of demand, high average starting salaries generally prevail. It is still necessary to look at individual occupations rather than major fields, however, since there is some within-group variation in supply/demand and wages.

What the Statistics Canada, one-time survey did support was the greater earning power of university graduates over college graduates. Average annual salaries of university graduates were almost three thousand dollars (20%) higher than those of college graduates. In addition, because the survey was based on a large sample, respondents constituted approximately one third of the graduate population. Thus, more in-depth information than was formerly available was gained from this one-time survey. In particular, there had been speculation in Out of School - Into the Labor Force* that salaries for university graduates, while increasing, did not keep pace with the overall rise in wages. In fact, when compared to average industrial earnings in Canada during the 1970s, average starting salaries for selected bachelor's degree recipients were dropping.[46] A weighted average, monthly salary (weighting factor was the number of persons graduating in each field) for graduates in engineering, honours science, honours arts, commerce and business administration pass and honours as well as pass arts or science was calculated for industry only. The weighted average salary was indexed to average monthly earnings in industry between 1965 and 1977.[47] The overall conclusion was that the financial advantage of bachelor's degree-holders rose during the 1960s to a high in 1968 and declined rapidly during the 1970s. The ratio of the graduates' starting salaries to average industrial wages dropped from 1.182 in 1968 to 0.888 in 1977.[48] The suggested explanation for the trend was that the unprecedented number of degree-holders entering the labor market in the 1970s was depressing the salaries that employers were obliged to pay.

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*This publication was co-authored by W. Clark and Z. Zsigmond who were also responsible for the follow-up, Job Market Reality for Post-secondary Graduates, both of which were Statistics Canada publications.

When the June, 1978 survey results are compared to those in Out of School - Into the Labor Force, a different picture emerges. Average annual incomes of all bachelor's graduates sampled was $14,800. During the same year, 1978, average wages in industry in Canada were $13,798[49]

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[46] Out of School - Into the Labor Force, p. 184.

[47] Ibid., pp. 185-188.

[48] Ibid., p. 188.

[49] Statistics Canada, Employment Earnings and Hours, Cat. # 72-002.

(a ratio of 1.07). Even young workers with a degree were enjoying a higher wage rate than the industrial composite wage which includes experienced workers. The earlier study had shown starting salaries for selected bachelor's graduates in 1977 as less than the industrial composite wage. Of course, there were differences in the two methodologies. The Out of School - Into the Labor Force study did not include all bachelor's graduates but rather a weighted sample from selected fields of study. Two counterbalancing factors emerge from this type of methodology. First, the idea of a weighted sample appears desirable since a larger proportion of bachelor's graduates emerge from certain fields such as general arts and science. On the other hand, by excluding many higher paid bachelor's fields, such as medicine and law, from the selected sample the weighted average is less in the Out of School... study than it would otherwise be.

A second methodological difference in the two studies was that the earlier publication, Out of School - Into the Labor Force, quoted starting salaries in industry only whereas the later study included the important public sector. The latter would include teachers, for example, who in a weighted sample make up a large percentage of graduates with higher than average incomes.

Since The Job Market Reality for Postsecondary Graduates was more comprehensive in scope, it would appear that the relative starting salary for the average university graduate had not deteriorated to the extent predicted earlier in the decade. Relative wages in the 1970s seemed to stabilize. That is, after a slight drop in advantage (as measured by bachelor's starting salaries relative to average industrial wages) between 1968 and 1971, the average graduate appears to have maintained a slight edge until 1978. As the preceding tables suggest, however, in some fields bachelor's starting salaries were below the average industrial wage for Canada. This was particularly true for those arts and science graduates in low demand, high supply specialties. For example, anticipated recruiting rates in industry for pass arts graduates (consistently the lowest paid field) gradually deteriorated from a ratio of .87 to average industrial wages in Canada in 1975 to .80 to average industrial wages in 1980.[50] One possible explanation for this trend is underemployment. General arts graduates may have had fewer job opportunities and been forced into accepting employment that formerly was filled by the less educated. That is, they received lower wages for jobs requiring lower credentials.

It is also possible that the fortunes of graduates in the public sector were better than in the private, industrial sector. Many public sector jobs start at higher wages than in industry. In the period in question, economic conditions were not as favorable for industry as they had been in the past. Perhaps decreasing profits were responsible for lower recruiting wages for arts graduates in industry while it would be more difficult to limit wages for experienced staff.

Using the wages of graduates from the 1978 Statistics Canada survey as a benchmark, enrolments in specific fields of study in Alberta universities in 1979 are now compared. It should be noted that the salary averages are for Canada since there is no provincial wage rate by field of study. Average incomes for all graduates in Alberta were higher than the national average. However, some figures may be understated. The purpose here is to determine if high average incomes in a specific field attract more students into that university discipline in the subsequent year. Are starting salaries for graduates a factor in attracting students? The same constraints apply to salary-enrolment comparisons as there were in supply-demand and enrolment trends. For example, qualified applicants are a better indicator of student interest in quota faculties than are enrolments.

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[50] Pay Research Bureau, Canada Public Service Staff Relations Board, Anticipated Recruiting Rates for University and Community College Graduates, 1975-1980.

Salaries of students emerging from Graduate Studies and Research were higher than average (see Table 4.15) in all but one discipline, religious studies. Most of the Master's and Ph.D. graduates were clustered at the top of the wage scale. Enrolments in this faculty changed little in 1979, however. In fact, there was a stable enrolment pattern throughout the decade, with small declines from beginning to end. Although the academic market had narrowed, it is apparent that at least the products of the 1976 Graduate Studies and Research class found jobs that generally paid well above the average university graduate income. Higher wages, however, did not seem to have been an incentive for attracting larger enrolments.

When the field of study is narrowed to specific occupations, such as in Tables 4.11 and 4.12, there is a general tendency for high salaries to be linked to high demand fields in which there is a supply shortage. However, enrolment trends are not as strongly related either to high salaries or to supply shortages. Among those specific fields or occupations commanding a higher than average (compared to all university and college graduates) wage rate in the 1978 study were: education, business, management and commerce, geology, engineering, mathematics, computer science, law, medicine, dentistry and pharmacy.

Education enrolments in 1979 did not appear to be affected by the higher than average starting salaries recorded in 1978. Large declines in education enrolments in Alberta were recorded in both 1978 and 1979 (see Table 3.13), in spite of the fact that recent degree recipients were earning more in the marketplace than many other graduates and that more than 87 percent of those in education were also satisfied with their incomes.

The survey indicated that both geology and mathematics graduates earned above average salaries for bachelor's recipients. Although there were large decreases in graduate school enrolments in these two fields towards the end of the 1970s, undergraduate enrolments were fairly stable in 1978 and 1979. There was no large increase in enrolments in response to better wages. Like those in education, geology graduates were also quite satisfied with their incomes. For university graduates, computing science was subsumed under the mathematics label in 1978. The average salaries thus included computing science majors who constituted the majority of graduates in 1979 (the first year they were segregated from the mathematics field by Statistics Canada).

Among the remaining higher than average graduate incomes cited are the quota faculties of business administration and commerce, engineering, law, medicine, dentistry and pharmacy. Among the latter, increased student interest, as measured by the number of qualified applicants, was recorded in 1979. In all of these disciplines there appears to be a positive relationship between higher than average incomes and increasing student interest. As well, these are fields in high demand with a controlled, low, provincial supply. Also of interest is the fact that this group generally expressed the most dissatisfaction with their higher than average incomes. Perhaps the awareness that their expertise is in short supply tends to raise the expectations of graduates in these fields. Having survived a rigorous quota selection process, graduates tend to expect higher starting salaries than the market is willing to provide, particularly when there are large numbers of imports.

The second group of disciplines selected from the 1978 survey are those in which graduates earned a salary that was below the average for university graduates. Included in these fields of study are: chemistry, physics, economics, sociology and English. Master's and Ph.D. graduates in these fields earned incomes which were consistently below the average for that level of education and the same finding applies to bachelor's graduates in all of these fields.

There appears to be a very weak relationship between 1979 Alberta enrolments in these fields and the apparent lower financial remuneration for graduates in the labor market. While economics enrolments grew slightly, physics declined and English, chemistry and sociology had comparatively stable enrolments. Generally, these low income areas were also low demand fields with supply surpluses. In other words, the relationship between salaries and demand was stronger than the relationship between salaries and subsequent enrolments.

Perhaps one explanation for the weak relationship of certain arts and science enrolments to starting salaries for graduates lies in the third column of Table 4.15, the percentage satisfied with their salary. Over 80 percent of the economics and physics bachelor's graduates were satisfied with their salaries although they ranked 67th and 83rd respectively. There were, in addition, other areas where graduates were receiving comparatively low wages but were quite contented with their incomes. Most surprising was the discipline of philosophy. While the field ranked 91st in average income, a remarkable 95 percent were satisfied with this low income. One could speculate that philosophers learn to be more philosophical than others about their poor financial circumstances. Potential starting salary in a particular occupation, then, may not be an important factor to some students in selecting a program of studies. The relationship between starting salaries and enrolments in some disciplines may be weaker because some students place a value on the inherent interest in a field irrespective of potential earnings. On the whole, however, there is a weak to moderate relationship between student interest in a particular field and starting salaries in that field. However, the intervening variable, job opportunities or demand, may carry more weight than starting salaries. High demand does appear to inflate starting salaries in many fields.

STARTING SALARIES FOR SELECTED OCCUPATIONS FOR CANADA, CALGARY AND EDMONTON, 1970-1980

This section is designed to provide a more in-depth comparison over time of starting salaries in five selected occupations. Trends in starting salaries in Canada, Edmonton and Calgary are compared and related to participation in the appropriate university disciplines from 1970 to 1980. In addition, the average wages in industry over the same period are provided to determine if the relative position of graduates had deteriorated over the 1970 decade.

It should be noted that (1) the selected salary rate measures are from the private industrial sector and exclude the public sector (2) only a small sample of five occupations is included and some data are incomplete (too small a sample in some cases to be reliable) (3) comparisons are for all Canada combined as well as for Calgary and Edmonton to determine the degree to which urban Alberta deviates from the national norm.

The five occupations have number designations which denote whether or not the occupational level is beginner or experienced. For example, one is usually an entrance level for an employee with less than two years experience, a starting salary. The job descriptions are as follows:

ENGINEER

Engineer 1

An entrance level. Work at this level is normally performed by a recent graduate with less than two years experience and is used only to provide initial training under the supervision of a more senior engineer. A variety of selected engineering tasks are performed in order to develop knowledge and skill in the practices of a field of engineering. The work includes preparing simple plans and designs, costing and making up bills of material in accordance with established codes, standards, drawings, and other specifications. The work occasionally includes checking the work of draftsmen and other technicians. University graduation is required in applied science or engineering or eligibility for certification as a professional engineer.

COMPUTER SYSTEMS ADMINISTRATOR

Computer Systems Administrator 1, Programmer 1A

Entrance and orientation level. Attends classes for initial training in computer programming. Receives on-the-job training. Under supervision, performs simple coding and arranges assemblies and tests and performs related work. Prepares control cards and statements for generalized and utility programs such as sorts, report generators, etc.

Computer Systems Administrator, Programmer 1B

Development level. Receives more comprehensive and varied on-the-job training. Is introduced to planning and preparation of problem definition and program specifications. Works closely with senior programmer with a view to broaden experience.

Computer Systems Administrator, Programmer 1C

This is a working level. Presumes familiarity with some phases of computer projects such as systems analyses, programming techniques and development of programs including their operation.

FINANCIAL ADMINISTRATOR

Financial Administrator 2: Internal Audit

Working level. Under supervision of the Audit Group Leader, audits records and accounts, performs physical test checks of inventory, stores, and equipment, and monitors operational systems. Reports errors, wasteful or improper practices, and other matters requiring further investigation.

OR

Financial Analyst or Accountant

Under supervision performs a variety of financial tasks which might include: examination of accounting statements for completeness, internal consistency and conformance with accounting principles; preparation of instructions for and overseeing the collection of input data for budgets and program reviews; preparation of financial statements; simple or prescribed analysis of statements, budget estimates, or program review data.

PHYSICAL SCIENTIST

Physical Scientist 1

A junior working level. Under supervision performs work at a professional level in one specialized area of the physical sciences. Activities are conducted within a limited scope and clearly defined objectives requiring application of routine, prescribed scientific techniques. Some examples of the work at this level are:

Mineralogist

Selects, examines and tests rock samples to assist in the age determination of geological formations and layers, determines mineral composition of rock samples submitted for analysis, correlates and records chemical and mineralogical data and prepares charts and drafts reports on analysis.

OR

Geological Assistant

Prepares geological compilation maps, compiles data for computer indexing, and prepares evaluation and assessment papers on mining exploration programs; assists in field surveys and collecting and interpreting data; analyzes and determines mineral composition of rocks.

OR

Water Management Scientist

Participates in planning, designing, controlling and administering projects in the development, use and conservation of water resources; organizes field studies and investigations; assembles and interprets test data, reports and survey results; provides advice on the bio-physical aspects of water and water management.

ECONOMIST STATISTICIAN

Economist - Statistician 1

> Under the direction of a section manager, plans and implements studies and surveys to investigate particular factors important to the section's overall research or data collection role. Using economic and statistical techniques some of which may be sophisticated, designs data collection systems required for his studies, analyzes data received, and reports the results of his studies. Prepares recommendations for program or policy changes, forwards these to his section manager and discusses and defends such recommendations as required. Liaises with data processing personnel in the design and operation of computer systems required for his studies and surveys.[51]

The following tables, Tables 4.16 to 4.25 provide Canada, Calgary and Edmonton data for each of the five occupations described. They include: the number of organizations (companies) surveyed, the number of employers and mean annual salaries for the three regions over the 1970 decade. A second table for each occupation compares the mean annual incomes to the average earnings in industry (industrial composite) for each region, a ratio of mean incomes to average earnings in industry between 1970 and 1980. The data are analyzed under several subheadings to determine the degree to which these limited examples conform to the aforementioned propositions.

Supply, Demand and Wages

It was generally concluded from a review of the Statistics Canada 1978 survey of university graduates that graduates in high demand and low supply earned the highest incomes, on the average. The relationship between high demand and high income, however, does not appear to be

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[51] Pay Research Bureau, Canada Public Service Staff Relations Board, *Salary Trends and Characteristics in Industrial and Other Organizations, An Update,* Ottawa, 1977, Appendix A, pp. 8-26.

TABLE 4.16

MEAN ANNUAL STARTING SALARIES IN INDUSTRY FOR ENGINEERS, CANADA, CALGARY, EDMONTON 1970 - 1980

Engineer 1	CANADA			CALGARY			EDMONTON		
	No. of Org.	No of Empl.	Mean	No. of Org.	No. of Empl.	Mean	No. of Org.	No. of Empl.	Mean
October 1 1970	13	571	8720	5	93	8433	5	93	8433
August 15, 1971	50	1082	9028	3	16	8326	6	41	8991
August 15, 1972	58	1234	9458	7	50	9557	7	29	9384
August 15, 1973	83	1590	9867	13	92	9762	11	63	9637
August 15, 1974	86	1968	10831	14	138	10997	11	88	10867
August 15, 1975	94	2159	12986	15	134	13105	12	113	13005
August 15, 1976	115	2215	14235	13	114	14008	11	73	13841
August 15, 1977	110	1988	15353	20	155	15188	13	86	14614
August 15, 1978	114	2126	16340	20	216	16249	15	88	16769
August 15, 1979	112	2405	17751	20	247	18064	13	134	18162
August 15, 1980	109	2563	20089	19	269	20679	14	165	20317

Source: Pay Research Bureau, Canada Public Service Staff Relations Board. Data compiled from computer tapes by N.B. Allen, Project Coordinator, Ottawa, 1981.

TABLE 4.17

AVERAGE ANNUAL STARTING SALARIES[1] IN INDUSTRY FOR ENGINEERS COMPARED WITH AVERAGE EARNINGS IN INDUSTRY[2], CANADA, CALGARY, EDMONTON 1970 - 1980

	CANADA			CALGARY			EDMONTON		
	1 Mean	2 av. earnings in Industry	3 Ratio: $\frac{1}{2}$	1 Mean	2 Av. earnings in Industry	3 Ratio: $\frac{1}{2}$	1 Mean	2 Av. earnings in Industry	3 Ratio: $\frac{1}{2}$
1970	8720	6595	1.32	8433	6590	1.28	8433	6334	1.33
1971	9028	7157	1.26	8326	7143	1.17	8991	6782	1.33
1972	9458	7759	1.22	9557	7702	1.24	9384	7607	1.27
1973	9867	8328	1.18	9762	8292	1.18	9637	7960	1.21
1974	10831	9261	1.17	10997	9134	1.20	10867	8908	1.22
1975	12986	10574	1.23	13105	10565	1.24	13005	10282	1.27
1976	14235	11858	1.20	14008	11906	1.18	13841	11390	1.22
1977	15353	12997	1.18	15188	12969	1.17	14614	12536	1.17
1978	16340	13799	1.18	16249	13855	1.17	16769	13398	1.25
1979	17751	14989	1.18	18064	15424	1.17	18162	15138	1.20
1980	20089	16503	1.22	20679	17543	1.18	20317	16668	1.22

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[1] Salary rate measures are surveyed every August (except for 1970, October) by the Pay Research Bureau. See Table 4.16.

[2] Average weekly earnings (Industrial Composite) x 52. Statistics Canada, "Employment and Hours," Cat. No. 72-002.

TABLE 4.18

MEAN ANNUAL STARTING SALARIES IN INDUSTRY FOR COMPUTER SYSTEMS ADMINISTRATORS, CANADA CALGARY, EDMONTON, 1970-1980

	CANADA			CALGARY			EDMONTON		
	No. of Org.	No. of Empl.	Mean	No. of Org.	No. of Empl.	Mean	No. of Org.	No. of Empl.	Mean
October 1, 1970	15	297	8597	5	60	9066	5	60	9066
August 15, 1971	60	1262	9309	4	37	10114	6	31	9824
August 15, 1972	77	1540	9904	8	64	10519	7	28	10340
August 15, 1973	95	1829	10343	9	91	10518	6	44	9221
August 15, 1974	101	2046	11494	10	81	11948	6	55	10483
August 15, 1975	109	2544	12831	10	89	13851	6	88	10740
August 15, 1976	147	2807	14233	10	93	14744	6	75	13362
August 15, 1977	142	2819	15434	16	149	15337	5	74	13752
August 15, 1978	151	2906	16466	16	115	16211	5	123	16671
August 15, 1979	149	2991	18015	17	124	17970	7	142	17837
August 15, 1980	153	3407	20172	16	210	20195	8	175	18950

Source: Pay Research Bureau, Canada Public Service Staff Relations Board. Data compiled from computer tapes by N. B. Allen, Project Coordinator, Ottawa, 1981.

TABLE 4.19

AVERAGE ANNUAL STARTING SALARIES[1] IN INDUSTRY FOR COMPUTER SYSTEMS ADMINISTRATORS COMPARED WITH AVERAGE EARNINGS IN INDUSTRY,[2] CANADA, CALGARY, EDMONTON, 1970 - 1980

	CANADA			CALGARY			EDMONTON		
	1 Mean	2 av. earnings in Industry	3 Ratio: $\frac{1}{2}$	1 Mean	2 av. earnings in Industry	3 Ratio: $\frac{1}{2}$	1 Mean	2 av. earnings in Industry	3 Ratio: $\frac{1}{2}$
1970	8597	6595	1.30	9066	6590	1.38	9066	6334	1.43
1971	9309	7157	1.30	10114	7143	1.42	9824	6782	1.45
1972	9904	7759	1.28	10519	7702	1.37	10340	7607	1.62
1973	10343	8328	1.24	10518	8292	1.27	9211	7960	1.16
1974	11494	9261	1.24	11948	9134	1.31	10483	8908	1.18
1975	12831	10574	1.21	13851	10565	1.31	10740	10282	1.05
1976	14233	11858	1.20	14744	11906	1.24	13362	11390	1.17
1977	15434	12997	1.19	15337	12969	1.18	13752	12536	1.10
1978	16466	13799	1.19	16211	13855	1.17	16671	13398	1.24
1979	18015	14989	1.20	17970	15424	1.17	17837	15138	1.18
1980	20172	16503	1.22	20195	17543	1.15	18950	16668	1.14

[1] Salary rate measures are surveyed every August (except for 1970, October) by the Pay Research Bureau. See Table 4.16.

[2] Average weekly earnings (Industrial Composite) x 52. Statistics Canada, "Employment and Hours," Cat. No. 72-002.

TABLE 4.20

MEAN ANNUAL STARTING SALARIES IN INDUSTRY FOR FINANCIAL ADMINISTRATORS, CANADA, CALGARY, EDMONTON 1970 - 1980

Financial Administration 2	CANADA			CALGARY			EDMONTON		
	No. of Org.	No. of Empl.	Mean	No. of Org.	No. of Empl.	Mean	No. of Org.	No. of Empl.	Mean
January 1, 1970	80	752	8913	8	66	8829	8	66	8829
August 15, 1971	51	631	9755	5	41	9182	6	27	10059
August 15, 1972	64	889	10558	9	72	10733	7	27	10892
August 15, 1973	84	1052	11333	12	99	11638	11	37	10879
August 15, 1974	85	987	13062	14	109	12527	6	23	12729
August 15, 1975	92	1108	14704	16	121	14631	6	25	13835
August 15, 1976	133	1483	16015	18	125	16381	10	42	16780
August 15, 1977	135	1314	17149	19	148	16344	10	53	17701
August 15, 1978	139	1509	19009	23	169	17281	10	43	19948
August 15, 1979	140	1348	20623	21	131	17845	12	40	19840
August 15, 1980	143	1529	22742	21	159	21109	15	87	22251

Source: Pay Research Bureau, Canada Public Service Staff Relations Board. Data compiled from computer tapes by N.B. Allen, Project Coordinator, Ottawa, 1981

TABLE 4.21

AVERAGE ANNUAL STARTING SALARIES[1] IN INDUSTRY FOR FINANCIAL ADMINISTRATORS COMPARED WITH AVERAGE EARNINGS IN INDUSTRY,[2] CANADA, CALGARY, EDMONTON, 1970 - 1980

	CANADA			CALGARY			EDMONTON		
	1 Mean	2 av. earnings in Industry	3 Ratio: $\frac{1}{2}$	1 Mean	2 av. earnings in Industry	3 Ratio: $\frac{1}{2}$	1 Mean	2 av. earnings in Industry	3 Ratio: $\frac{1}{2}$
1970	8913	6595	1.35	8829	6590	1.34	8829	6334	1.39
1971	9755	7157	1.36	9182	7143	1.29	10059	6782	1.48
1972	10558	7759	1.48	10733	7702	1.39	10892	7607	1.43
1973	11333	8328	1.36	11638	8292	1.40	10879	7960	1.37
1974	13062	9261	1.41	12527	9134	1.37	12729	8908	1.43
1975	14704	10574	1.39	14631	10565	1.39	13835	10282	1.35
1976	16015	11858	1.35	16381	11906	1.38	16780	11390	1.47
1977	17149	12997	1.32	16344	12969	1.26	17701	12536	1.41
1978	19009	13799	1.38	17281	13855	1.25	19948	13398	1.49
1979	20623	14989	1.38	17845	15424	1.16	19840	15138	1.31
1980	22742	16503	1.38	21109	17543	1.20	22251	16668	1.34

[1] Salary rate measures are surveyed every August (except for 1970, October) by the Pay Research Bureau. See Table 4.16.

[2] Average weekly earnings (Industrial Composite) x 52. Statistics Canada, "Employment and Hours," Cat. No. 72-002.

TABLE 4.22

MEAN ANNUAL STARTING SALARIES IN INDUSTRY FOR PHYSICAL SCIENTISTS, CANADA, CALGARY, EDMONTON 1970 - 1980

Physical Scientist 1	CANADA No. of Org.	CANADA No. of Empl.	CANADA Mean	CALGARY No. of Org.	CALGARY No. of Empl.	CALGARY Mean	EDMONTON No. of Org.	EDMONTON No. of Empl.	EDMONTON Mean
1970	-	-	-	-	-	-	-	-	-
1971	-	-	-	-	-	-	-	-	-
1972	-	-	-	-	-	-	-	-	-
1973	-	-	-	-	-	-	-	-	-
July 1, 1974	27	247	12566	-	-	-	-	-	-
July 1, 1975	26	326	14633	-	-	-	-	-	-
July 1, 1976	27	357	15946	-	-	-	-	-	-
July 1, 1977	34	346	16719	-	-	-	-	-	-
August 15, 1978	30	293	18970	17	205	18117	3	10	18390
August 15, 1979	28	313	20655	13	216	19785	-	-	-
August 15, 1980	28	396	23388	12	269	23039	-	-	-

Source: Pay Research Bureau, Canada Public Service Staff Relations Board. Data compiled from computer tapes by N.B. Allen, Project Coordinator, Ottawa, 1981.

TABLE 4.23

AVERAGE ANNUAL STARTING SALARIES[1] IN INDUSTRY FOR PHYSICAL SCIENTISTS COMPARED WITH AVERAGE EARNINGS IN INDUSTRY,[2] CANADA, CALGARY, EDMONTON, 1970 - 1980

	CANADA			CALGARY			EDMONTON		
	1	2	3	1	2	3	1	2	3
	Mean	av. earnings in Industry	Ratio: ½	Mean	av. earnings in Industry	Ratio ½	Mean	av. earnings in Industry	Ratio: ½
1970	-	6595	-	-	6590	-	-	6334	-
1971	-	7157	-	-	7143	-	-	6782	-
1972	-	7759	-	-	7743	-	-	7607	-
1973	-	8328	-	-	8292	-	-	7960	-
1974	12566	9261	1.36	-	9134	-	-	8908	-
1975	14633	10574	1.38	-	10565	-	-	10282	-
1976	15946	11858	1.34	-	11906	-	-	11390	-
1977	16719	12997	1.29	-	12969	-	-	12536	-
1978	18970	13799	1.38	18117	13855	1.31	18390	13398	1.37
1979	20655	14989	1.38	19785	15424	1.28	-	15138	-
1980	23388	16503	1.42	23039	17543	1.31	-	16668	-

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[1] Salary rate measures are surveyed every August (except for 1970, October) by the Pay Research Bureau. See Table 4.15.

[2] Average weekly earnings (Industrial Composite) x 52. Statistics Canada, "Employment and Hours," Cat. No. 72-002.

TABLE 4.24

MEAN ANNUAL STARTING SALARIES IN INDUSTRY FOR ECONOMIST-STATISTICIANS, CANADA, CALGARY, EDMONTON 1970 - 1980

Economist-Statistician 1	CANADA No. of Org.	CANADA No. of Empl.	CANADA Mean	CALGARY No. of Org.	CALGARY No. of Empl.	CALGARY Mean	EDMONTON No. of Org.	EDMONTON No. of Empl.	EDMONTON Mean
July 1, 1970	20	62	8638	-	-	-	-	-	-
July 1, 1971	42	335	11452	-	-	-	-	-	-
July 1, 1972	40	288	12085	-	-	-	-	-	-
July 1, 1973	38	262	12282	-	-	-	-	-	-
July 1, 1974	38	268	14144	5	14	14801	5	14	14801
July 1, 1975	35	291	16338	3	12	18429	3	12	18429
July 1, 1976	33	267	18255	4	15	21118	4	15	21118
July 1, 1977	35	198	19181	6	14	20355	6	14	20355
July 1, 1978	37	182	20575	7	23	21227	-	-	-
August 15, 1980	29	135	21056	5	11	23062	-	-	-
August 15, 1980	33	134	23192	5	11	25693	-	-	-

Source: Pay Research Bureau, Canada Public Service Staff Relations Board. Data compiled from computer tapes by N. B. Allen, Project Coordinator, Ottawa, 1981

TABLE 4.25

AVERAGE ANNUAL STARTING SALARIES[1] IN INDUSTRY FOR ECONOMIST-STATISTICIANS COMPARED WITH AVERAGE EARNINGS IN INDUSTRY,[2] CANADA, CALGARY, EDMONTON, 1970 - 1980

	CANADA			CALGARY			EDMONTON		
	1	2	3	1	2	3	1	2	3
	Mean	av. earnings in Industry	Ratio: ½	Mean	av. earnings in Industry	Ratio: ½	Mean	av. earnings in Industry	Ratio: ½
1970	8638	6595	1.31	-	6590	-	-	6334	-
1971	11452	7157	1.60	-	7143	-	-	6782	-
1972	12085	7759	1.56	-	7702	-	-	7607	-
1973	2282	8328	1.48	-	8292	-	-	7960	-
1974	14144	9261	1.53	14801	9134	1.62	14801	8908	1.66
1975	16338	10574	1.55	18429	10565	1.74	18429	10282	1.79
1976	18255	11858	1.54	21118	11906	1.77	21118	11390	1.85
1977	19181	12997	1.48	20355	12969	1.57	20355	12536	1.62
1978	20575	13799	1.49	21227	13855	1.53	-	13398	-
1979	21056	14989	1.41	23062	15424	1.50	-	15138	-
1980	23192	16503	1.41	25693	17543	1.47	-	16668	-

[1] Salary rate measures are surveyed every August (except for 1970, October) by the Pay Research Bureau. See Table 4.16.

[2] Average weekly earnings (IndustrialComposite) x 52. Statistics Canada, "Employment and Hours," Cat. No. 72-002.

a simple one. That is, those in highest demand are not necessarily on the top of the income ladder in terms of starting wages. Although it is not possible to generalize from such a small sample taken from the industrial sector only, the five occupations selected do not rank from high to low in terms of greatest demand - highest salary, lowest demand - smallest salary. Engineers, computer administrators and financial administrators are among the occupations in highest demand in Alberta (see Tables 4.11 and 4.12). Yet starting salaries for these three careers were below those of physical scientists and economist-statisticians in August, 1980, in Canada as well as in Calgary and Edmonton (Tables 4.16, 4.18, 4.20, 4.22, 4.24). Demand in the latter two careers was forecast to be lower with the exception of those physical scientists in geology where demand was great. Starting salaries were higher, nonetheless. Nor did there appear to be a cumulative effect of shortages towards the end of the 1970 decade. That is, the relative income (relative to the industrial composite) of engineers and computer administrators did not improve over the 1970s irrespective of growing shortages. It should be noted that, although there were differences in starting salaries among these occupations, all selected were well paid careers which would be above average for bachelor's graduates.

Enrolments and Starting Salaries

In the same manner that salaries in the five occupations do not rank from high to low on a demand-income basis, the highest paid starting salaries do not correspond to the highest university enrolments in an area of specialization. Engineering had the largest Alberta faculty enrolments among the five disciplines but ranked second lowest in starting income in Edmonton and Calgary by the end of the 1970 decade. Relative starting salaries for engineers altered little during the ten year period. Yet increasing interest by students in the faculty brought about enrolment quotas in the last half of the decade.

Computer science enrolments were fairly stable but small at the undergraduate level and declined at the graduate level in Alberta during the last half of the survey period. Salaries at the starting level were close to those for engineers, however.

Business administration and commerce showed enrolment declines in Alberta but there were increasing numbers of qualified applicants to the faculty in the latter half of the 1970 decade. The large number of students enroled in the program also tends to correspond to the high starting salaries for accountants and financial analysts in industry.

Physical scientist includes geology as well as ecology, physics, botany and forestry. Fairly stable undergraduate enrolments in the physical sciences have been observed in Alberta. At the graduate school level, there were enrolment declines in geology, physics and botany during the last two years of the decade but a stable enrolment in the forest science section of agriculture. Although starting salary data for the physical scientist category is incomplete, the available salaries indicate very healthy relative wage levels, second highest of the five occupations and considerably above the average earnings in industry. Enrolment size and patterns are not indicative of these high starting salaries.

Highest starting salaries were paid to economist-statisticians over the 1970 to 1980 period. Economics enrolments were stable at the undergraduate level over the last half of the decade in Alberta. The mathematics-statistics component showed slight increases in enrolment at the undergraduate level but fairly large decreases in enrolments at the graduate level during the same period in Alberta. In terms of actual volume, if economics and mathematics enrolments were added together, they would be just over half the size of the commerce group in spite of the fact that they were commanding higher starting salaries in all regions.

In summary, neither the overall size of enrolments nor the changing patterns of enrolment in the five disciplines appeared to suggest a response to starting salaries in industry between 1970 and 1980.

Regional Variations in Starting Salaries

The Canada averages are included with Calgary and Edmonton to point out the degree to which urban Alberta differs from the national mean in starting salaries and average industrial earnings. The decade in question was one of large economic growth in Alberta while most of the provinces were experiencing a comparative slump. To what extent was this comparatively large economic growth in Alberta reflected in starting salaries for the selected university graduates in Calgary and Edmonton as compared to all Canada combined? Were there changes over time in the comparative position of national and regional wages? In the latter half of the decade, one would expect higher wages in Alberta than Canada because of a more rapidly expanding labor force. The particular occupations selected include fields in very high demand in Alberta, an additional factor which frequently inflates starting salaries.

When the three average annual earnings in industry are compared as in Table 4.17, the national average of $6595. was ahead of Calgary's 6590. and Edmonton's $6334. in 1970. By the end of 1980, however, the relative national-regional positions were reversed. Both Calgary ($17,543) and Edmonton ($16,668.) had surpassed the average earnings in industry ($16,503) for all Canada combined. The expected, then, did actually occur. During the first half of the 1970 decade, national average earnings in industry were higher than in Edmonton and Calgary while during the last half of the decade the two western cities edged upwards finally surpassing the national averages in 1979 and 1980. The comparative economic boom did inflate wages in Alberta although the national-regional differences were never great at any point in the decade.

In terms of starting wages for university graduates, the rate of change seemed to generally parallel the overall increases in average industrial earnings in the three regions. Highly qualified manpower did not enjoy any larger growth or percentage increase in wages above the average industrial worker in Calgary and Edmonton. For example, mean annual incomes for engineers were higher nationally in 1979 than they were in Calgary and Edmonton. By 1980, the converse was true (see Table 4.16). The increase in engineers' wages generally stayed about the same ratio to average wages in industry in all of Canada combined as it did in Edmonton and Calgary (see Table 4.17). The incomes of people in urban Alberta were generally increasing compared to national incomes but there was no indication that those of the selected university graduates were growing at a faster rate than general incomes in industry. There was only one occupation where western employees had an edge over the national average. Economist-statisticians in Calgary and Edmonton had a higher ratio of earnings to average industrial wages than did the national group. Provincial and national trends in other areas were surprisingly close. Perhaps this is a reflection of the fact that the selected occupations are in high demand in all of Canada although admittedly higher in Alberta.

If nothing else, the results support the findings of The Job Market Reality for Postsecondary Graduates which indicate that regional economic conditions are not the only factor producing varying wage rates for university bachelor's graduates. The survey showed Newfoundland employees at the top of the bachelor's wage scale.

Relative Starting Salaries for University Graduates

A final consideration is whether or not the financial rate of return from a university education was diminishing during the 1970s. That is, did the relative competitive position of graduates decline compared to average industrial earnings? For each of the five careers selected and for the Canada, Calgary and Edmonton regions, there is a table showing the ratio of mean annual salaries to average industrial incomes over time (see Tables 4.17, 4.19, 4.21, 4.23, 4.25).

In all of the occupations selected, average earnings remained well above the industrial composite between 1970 and 1980. In two of the occupations, engineering and computer systems administration, there was a small decline in the financial advantage between 1970 and 1980. The ratio of graduates' starting salaries (in both fields) to the average industrial wage dropped from general highs in 1970 of 1.30 and above to the 1980 figure of 1.22 and below (Tables 4.17, 4.19). The increasing shortages in the labor market for these two occupations did little to enhance relative earning power during the 1970s either nationally or in urban Alberta.

On the other hand, the income advantages for financial administrators (Table 4.21), physical scientists[52] (Table 4.23) and economist-statisticians[52] (Table 4.25) did not appear to deteriorate over the decade. Financial administrators started the decade with a high ratio of starting salaries to average industrial earnings and actually improved their financial advantage at the national level. Physical scientists seemed to be following the same improvement path and economist-statisticians showed a consistently high ratio.

There is no overall support for the declining financial advantages of a university education, at least not in this limited selection of five specialties. Decline in some fields was counterbalanced by increasing advantages in others. Again, this finding may be the result of the particular occupations selected. Or, it may well be that when salaries in the public sector are added to salaries in the private, industrial sector other trends could surface.

CONCLUSION

Few firm conclusions can be drawn from the data on starting salaries for university graduates. While it is true that salaries tend to be higher in fields with high demand, occupations do not follow a rank order of high demand, high salary. Among the confirmed expectations was the fact that higher levels of education generally command larger incomes. University graduates are better paid than college graduates and master's and Ph.D.'s cluster near the top of the wage scale in starting salaries.

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[52] Conclusions are based on incomplete data for this occupation.

In terms of university enrolments, declines and increases in specific disciplines do not necessarily relate to starting salaries in these occupations. In some low salaried careers, enrolments are very consistent over time.

Finally, regional variations in starting salaries are not always predictable. Regional economic conditions appear to have a greater relationshop to job opportunities or demand than they do to starting salaries. That is, there may be many more jobs available in a particular field in Alberta than in Newfoundland, but the remuneration for those who obtain the jobs may be quite similar in both provinces. The data analyzed in this section suggest that the competitive financial position of graduates in the labor market does not necessarily deteriorate as demand decreases. Moreover, one of the tenets of the world systems model was that consistent high demand in Alberta would keep starting salaries for university graduates comparatively high. While the five occupations selected were well paid in Alberta relative to average industrial earnings, they were quite similar in income averages and wage ratios to the national data where demand was lower.

It is likely that many factors discussed in this section are "block-booked." That is, there are many variables associated with the dependent and independent variables.[53] The relationship between salary and student interest may be conditional on job opportunity or job satisfaction. The fact that some graduates are very satisfied with poor salaries suggests differing motivations and expectations. Moreover, if a student is aware that there are very few jobs available in a particular occupation, or very few training places available at university, he may shy away from a field where remuneration is high. Better a job with a comparatively low salary than no job at all. Or, a guaranteed place in a less prestigious faculty may be perceived as more advantageous than intense competition in a quota faculty. It is also very important to remember that there are many factors which influence wage levels. Salaries are often kept high in spite of low demand in the labor market. For example, some occupations keep wages high because workers have a stronger bargaining position or more vocal unions. However, few new recruits may gain entry to these well-paid positions. Thurow[54] questions former notions about "wage-competition theory" which posits that people come into the labor market with a pre-existing set of skills and they compete with one another on the basis of wages. Businesses are "told" to raise or lower wages as skill-shortages or skill-surpluses become apparent. Thus, wages are used to encourage or discourage individuals from seeking a particular skill package and the market for each skill is kept closer to balanced. Thurow[55] claims that wage competition theory has many defects and that traditions of wage differentials, unions, professional associations, training costs and technical progress all influence the wage associated with each job. The fact that enrolments in universities did not seem to be closely related to starting salaries in individual occupations may be explained by these observations. To reiterate, getting a job in the first place may assume more importance to graduates than the wage level. In addition, students may be motivated by average earnings ten years down the road than by starting salaries in an occupation.

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[53] Morris Rosenberg, The Logic of Survey Analysis (New York: Basic Books, Inc., 1968), pp. 26-27.

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[54] Lester C. Thurow, "Education and Economic Equality" in J. Karabel and A. H. Halsey, Power and Ideology in Education (New York: Oxford University Press, 1977) pp. 325-335.

[55] Ibid., p. 326, 330.

Finally, perceptions about the state of the labor market may be inaccurate. These perceptions may override one's occupational values in career selection. All of the aforementioned factors may be influential in student choice. The design of the present research does not reveal the relative weight or each, however.

CHAPTER V

SUMMARY AND CONCLUSIONS

The main goal has been to analyze the relationship between a university education and the labor market in Alberta. In particular, the focus was on the supply of and demand for Alberta university graduates and on possible feedback, including income incentive, from one to the other. The impetus for the study was born out of speculation voiced in the literature review about a deteriorating job market for university graduates in the 1970s. In retrospect, the concerns about declining demand in Alberta were unfounded.

Early in this research it was suggested that labor market changes are generally the result of larger social and economic processes. The world systems model was adopted as a framework from which to interpret social change. It is particularly appropriate for emphasizing the global interrelationships that characterize the twentieth century. One need only to peruse daily news accounts to comprehend the degree to which events in one country can reverberate around the world. It is suggested that this same "domino effect" is felt in the Alberta labor market. World economics has created somewhat of an anomaly out of the province while it remains, at the same time, under the social and political umbrella of Canada. The summary and conclusions which culminate this work are expressed within this broad framework of social change.

The last four pages of Chapter II in this research consist of a list of propositions or expectations which the world systems model would suggest about the university education/labor market link in Alberta. For the most part, these 12 "tenets" accurately explain the changes in the Alberta labor market over the last decade. The foregoing data generally substantiate the underlying thesis in the model that the economic and cultural events in the world capitalist system have a direct bearing on the supply of and demand for university trained manpower in Canada. The implications of the data for each paraphrased tenet follow.[1]

The expansion period in the world capitalist system which preceded the last decade was a time of economic boom across Canada. Alberta followed in the footsteps of a culturally dominant central Canadian core and expanded its higher educational system in tandem with that core. The university expansion preceeded the expansion of other postsecondary institutions. A growing number of skilled professionals entered the Alberta labor force. Although the evidence is inconclusive, during the expansion period a smaller proportion of the labor force with degrees in Alberta relative to the remainder of Canada suggests a brain drain to central Canada. During the expansion phase, demand for university manpower was high and starting salaries for graduates were consistently above average industrial wages. Alberta accepted the prevailing rationale for expansion based on the belief that a more educated labor force would provide a direct economic gain for the country. In the same manner as

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[1] For an exact list of the propositions see Chapter II, final four pages.

Canada was open to U.S. cultural influence and economic investment, Alberta was open to central Canadian ideology. Of course, the entire continental mood was one of optimism about future economic gains that would accrue from training more highly-educated technological and managerial specialists.

The events in Alberta during the expansion phase confirm the expectations derived from tenet 1: similar patterns of supply and demand for university educated manpower across Canada, a brain drain from Alberta to central Canada and the pervasive cultural dominance in which the semi-periphery unquestioningly accepts the prevailing core rationale for rapid, higher educational expansion.

The second tenet evolves from the contraction period in the world capitalist system, roughly dated as the beginning of the 1970s but firmly cemented by the OPEC oil cartel in 1973. In line with expectations, Alberta experienced an unanticipated economic surge as a strong semi-periphery. A booming provincial economy produced unique labor market trends. Both the demographic analysis in Chapter III and the labor force growth and demand estimates revealed in Chapter IV suggest a very favorable labor market in Alberta relative to the remainder of Canada during the last decade. The latter two chapters also supply ample evidence to support tenet 3, that labor market growth in Alberta had been, for economic reasons, consistently high during the 1970s including the "professional" or university trained market.

Tenet 4 is related directly to tenet 3 and proposes that demand for university trained manpower will remain high because of a growing economy, research and development activity and energy mega-project construction. During the time frame analyzed in Chapter IV, there was indeed a high demand in a buoyant Alberta economy. However, the strength of the world systems model lies in its emphasis on the role of economic and political events in labor market activity. Tenet 4 suggests that high demand in Alberta was created by and is contingent upon certain economic factors. Changes in the latter rapidly ripple through the labor market. In the same vein, the manpower forecasts used in this thesis are developed by projecting economic trends over a mid-range period of 5 to 7 years. Any dramatic, long term change in the economy can render the forecasts inaccurate. Short term fluctuations tend to be absorbed without problems. From the hindsight of 1982, the labor market in Alberta took a pronounced dip during 1981. While still comparatively well off, Alberta experienced higher levels of unemployment, and levels of unemployment for degree holders tend to fluctuate in relation to general levels of unemployment. From a world systems view, one event can shake the foundations of many countries. Quite simply, world oil prices did not soar to the levels predicted for 1981, there was a glut of oil on world markets and the stalled Alsands project began to flounder. Huge investments usually are made on a fairly solid promise of future profit returns and the likelihood of large returns was diminishing while the interest on investment loans was prohibitive. Soaring debt loads in the petroleum industry and other factors discouraged continued investment in oil sands projects. The latter require large, initial capital outlays but do not come "on stream" and show returns until many years later.

As the world systems model suggests, the domino effect hit Alberta and the 1981 labor market did not match that of 1980. With the shelving of Alsands in 1982 and strong recessionary trends in Canada, it is likely that exacerbated dips through 1982 and 1983 would greatly reduce the manpower shortages revealed in this research. The forecasts are prepared in anticipation of the smooth completion of mega-projects planned for the province to 1985. In short, as much of the world economy goes, so does the Alberta labor market for university graduates.

Tenet 5, that consistent high demand will keep starting salaries for university graduates relatively high compared to average industrial earnings, is at least partially supported by the salary data in Chapter IV. That is, university graduates in the Alberta labor market during the last decade had an average salary that surpassed average industrial wages. Whether or not it is demand that directly influences wage levels is a moot point, however. As suggested earlier, unions, traditions of wage differentials, training costs and the general direction of technical progress, which creates a particular mix of jobs, all influence the wage that is associated with each job.[2] Demand is only one of many influential factors.

A surprising outcome of this research was the drop in educational participation rates and actual enrolments in Alberta universities during the latter part of the 1970s. Tenet 6 predicts that available job opportunities and higher relative earnings for university graduates in Alberta will stimulate increases in enrolments. While Chapter IV suggests that Alberta did have the high wages and job opportunities during the last half of the 1970s, these two factors did not have the anticipated effect on universities. One explanation for this finding is that the cultural dominance of the central Canadian core, as expressed in tenets 9 and 10, is so powerful as to mitigate the expected impact on universities in an atypical Alberta. Nationally expressed fears of a declining labor market for highly skilled manpower may have generated a mood of caution among potential university students in Alberta. That is, in spite of the unusually large labor market demand in Alberta, many other aspects of the relationship between a university education and the labor market that emerged from this analysis were remarkably close to those on the general Canadian scene. Prime among the latter were the findings about the supply of university graduates to the labor force. General enrolment patterns were similar in most provinces. Alberta's student population declined in 1978 and 1979 at a time when the postsecondary age group was expanding. Provincial participation rates were among the lowest in Canada. That is, when demand for graduates was spiraling in Alberta, university enrolments were dropping. Part of this drop was estimated to be the result of a buoyant labor market for non-graduates. Student populations are "aging" and it is likely that many, particularly males, are deferring entry to university while they obtain some work experience.

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[2] Thurow, p. 330.

The overall impact on the labor force is determined by the numbers graduating. There was a steady but not huge increase in degrees granted during the 1970s which will be followed by slight declines in the 1980s. As a result, total output between 1975 and 1980 is very close to the output anticipated between 1980 and 1985. Irrespective of economic and labor market circumstances, a steady supply of Alberta university graduates will emerge over a ten year period.

These supply trends are somewhat of a contradiction to general economic trends in Alberta during the same period. In summary, Alberta appears to mimic general, national trends and attitudes. When national media sources were replete with "the unemployed graduate" line, students in Alberta seemed to respond when, in fact, Alberta circumstances did not mirror the national scene.

The same cultural dominance explanation also applies to tenet 7, that gains in access to universities will continue to be made by females and lower classes as enrolments grow. Notwithstanding the fact that enrolments declined during the late 1970s, the female segment of that enrolment increased. The women's movement can be interpreted as both a class action and an example of cultural dominance in the world systems model. It is a movement which transcends national boundaries. The exodus of women from the homemaker role into the labor market is a national and international phenomenon. The increasing female presence in local universities is not surprising when one considers the cultural impact of these trends in both the United States and Canada.

The data do not reveal the proportion of students from lower socioeconomic classes in Alberta universities. It is more likely, however, that gains by lower classes may have been made in the first half of the 1970 decade, when enrolments were growing, than in the latter half.

Edward Harvey found that the proportions of individuals from lower socioeconomic backgrounds (as measured by father's education) had increased in Canadian universities between 1968-69 and 1974-75.[3] However, the smallest increase (+ 0.2%) was found in the Prairie provinces. As enrolments started to decline during the last half of the decade, it is possible that there was a concurrent decline in the proportion of lower socioeconomic students in Alberta universities. Several research findings support this speculation. First, as gains in access to universities were made by lower socioeconomic classes during the expansion period, the gains were primarily in fields of study such as education and arts and sciences.[4] Enrolment declines in the latter fields of specialization were among the largest in Alberta universities during the last half of the 1970 decade. On the other hand, students from higher socioeconomic backgrounds continued to be particularly over-represented in the more prestigious areas of law and medicine between 1968 and 1974.[5] While Alberta university enrolments generally declined during the latter half of the decade, these prestige fields showed a steady growth and the number of applications to them rose substantially. It is reasonable to assume that the traditional over-representation of upper socioeconomic classes in such faculties as medicine and law continued through the decade. Research on social class and education supports the importance of socioeconomic class as a key determinant of educational aspirations as well as access to and choices within post-secondary education.[6] At any rate, the small gains in access to universities made by lower socioeconomic classes during the early part of the last decade were insignificant when compared to the increased representation of females in universities over the decade.

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[3] Edward B. Harvey, Opportunity and Choice. Rough draft of a manuscript written in 1977, Ontario Institute for Studies in Education, pp. 63-74.

[4] Ibid., p. 74.

[5] Ibid., p. 87.

The data in Chapters III and IV also support tenet 8, that high demand in Alberta, coupled with lowered demand in other areas of Canada, brought university graduate migration to Alberta. The increase in the university educated labor force, particularly between 1975 and 1980, indicates a strong reverse brain drain from core to semi-periphery. Interprovincial migration to Alberta surpassed all forecasts during the latter half of the decade. This free interprovincial migration obviously diminished the impact of the demand for university graduates in the province. The supply-demand analysis in Chapter IV relates provincial supply to provincial demand. It is apparent that shortages in many occupations would be substantially reduced through in-migration.

Tenets 9 and 10 deal with the cultural and economic dominance of core over semi-periphery. It is suggested in tenet 9 that power struggles between core and semi-periphery may possibly mitigate demand for skilled manpower in Alberta as core asserts economic dominance, possibly through resource taxation. During this research time frame, power struggles in the area of resource taxation and provincial/federal jurisdiction over resources were evident. The ultimate impact of some of those struggles was not apparent until mid-1981 when political delays began to have economic repercussions in the labor market. The analysis in this thesis does not suggest a mitigation in the demand for skilled manpower in Alberta because the time frame preceded the period (1981-82) when demand began to decline. However, recent events confirm tenet 9. The political delays in approval and/or support for the Alsands project apparently contributed to its demise. The economic forecasts for the project appeared sunnier in the earlier stages of negotiation than in the later stages. It is also possible to speculate that resource taxation probably had some mitigating influence on Alberta labor market demand for university graduates.

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[6] Key studies demonstrating these relationships include John Porter, The Vertical Mosaic (Toronto: University of Toronto Press, 1965; Raymond Breton, Social and Academic Factors in the Career Decisions of Canadian Youth (Ottawa: Information Canada, 1972); Marian R. Porter, John Porter and Bernard R. Blishen, Does Money Matter? Prospects for Higher Education (Downsview: Institute for Behavioural Research, York University, 1973).

Tenet 10 alludes to the cultural dominance of the core as reflected in the Alberta supply trends in university education which mirror national trends while the province was experiencing anomalies in labor market growth and demand for university trained manpower. This tenet actually takes precedence over tenet 6 to explain why universities did not share in the Alberta expansion boom.

Similarly, tenet 11 indicates an additional area of cultural nationalism, fiscal policy. Patterns of financing for Alberta universities reflect general Canadian trends more than the province's financial capacity for providing support. When political and social approval for higher education started to wane, the province bent toward the national mood. While other governments in Canada may be financially justified in imposing rigid controls on higher educational expenditures, Alberta is not. Yet the province also followed the national policy of almost unlimited educational expansion in a much leaner provincial era. The evidence suggests that, amid cries of western political separation, Alberta still falls under the Canadian cultural umbrella. For higher educational institutions, there is a necessity to respond and adapt to external political, social and financial pressures.

The final tenet 12 derived from the world systems model also ties the booming resource economy and its planned mega-projects to increased labor market demand in Alberta, particularly when compared to general Canadian trends. The migration component augments the growth since a population shift also brings a parallel money transfer in addition to increasing the need for education, social, health and other services. The same proviso that applies to tenet 4 also applies to tenet 12, however. Changes in the world economy which are felt at the national and provincial level can substantially alter expectations about labor market demand. During the time frame used in this research, economic conditions in Alberta were favorable. Recent events have brought the province into closer harmony with general recessionary trends.

In conclusion, the world systems model has proven to be a useful theory in explaining changes in the Alberta labor market for university graduates. It would appear that the model provides an accurate perspective on social change in the twentieth century at any level: local, regional, national or international.

Some additional observations and conclusions emerge from the supply-demand analysis. This thesis was initially designed to examine the concept of feedback from the labor market to the university system. That is, as job opportunities become more plentiful and salaries go up, student enrolments also grow. Between 1975 and 1980 there was no such growth in total enrolments in Alberta universities in spite of a buoyant market.

When enrolments are segregated by field of specialization, there is a suggestion of some response by students to labor market shortages. In spite of increasing competition from graduate imports for available jobs, large shortages in engineering, computer programming (administration) and business fields such as auditing and accounting were very apparent in Alberta. In the Faculties of Business Administration and Commerce and Engineering, there was a corresponding increase in the number of qualified applicants. Computing science undergraduate enrolments showed slight increases but graduate enrolments declined, however. In addition, the decline in many graduate arts and science fields was accompanied by an increase in qualified applicants to alternate areas such as pharmacy, law, dentistry and medicine in the late 1970s. The data suggest that many students were concerned about choosing marketable specialties. The move to those fields which have historically fared well in the labor market supports this hypothesis.

Other factors appear to mitigate the strength of the relationship between student response and the labor market. Some areas which turned up qualified shortages in the supply-demand analysis had corresponding enrolment declines and vice versa. Education was the field foremost among the schools in decline yet with a high labor market demand. On the other hand, such fields as sociology and chemistry had rather consistent enrolments in light of the small annual requirements in the labor force and frequent surpluses.

Several explanations can be offered for the less than perfect relationship between job opportunities and enrolment patterns in Alberta. In the first place, supply-demand imbalances in this research are for Alberta supply and Alberta demand. It may well be that graduate imports greatly reduce job opportunities in some fields. For example, it is known that approximately 30 percent of all Alberta, new, interim certificates granted during the 1970 decade were to teacher imports.[7] The influx of university graduates may be obliterating the calculated shortages in some fields. Advertised job vacancies, however, indicate that there are many areas where imports combined with provincial graduates are insufficient to meet the large demand. If imports greatly alter the stated supply-demand imbalances in some fields in Alberta, then perhaps students are more responsive to the real labor market than this research is able to reveal. Richard Freeman's conclusion "that the market for college-trained specialists is governed by economic forces in a relatively direct way"[8] had already been supported. Perhaps his conclusion that "There is a substantial and growing body of evidence that young persons...are highly sensitive in their educational and career decisions to the state of the labor market"[9] is also accurate. The data, however, can only provide moderate support for such a view because of the exceptions which arise when job opportunities in certain fields are related to enrolments in these areas.

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[7] Projecting K-12 Teacher Supply and Demand in Alberta, p. 73.

A second plausible explanation is that students would be even more responsive to the labor market if they had up-to-date information and future forecasts of that market. The prevailing climate of opinion can frequently mask certain realities from potential university students. As previously mentioned, national press tends to cloud the actual labor market picture in Alberta. Warnings of tremendous Canadian teacher surpluses are not, according to some recent studies, applicable to Alberta. Population growth in the province combined with other factors suggests that even when the large numbers of teacher imports are included there was only a slight surplus of teachers in Alberta at any time during the 1970s.[10] Moreover, when enrolments were declining the most, shortages were becoming more apparent. The response by students was possibly a lag from the one year, 1975-76, when teacher demand (when imports are included) was considerably less than supply. It may well be that if effective communication regarding the actual as well as the future state of the labor market were available to students that greater response would be observed.

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[8] Richard B. Freeman, The Market for College-Trained Manpower (Cambridge, Massachusetts: Harvard University Press, 1971). p. 227.

[9] Richard B. Freeman, The Over-Educated American (New York: Academic Press, 1976), p. 53.

[10] Projecting K-12 Teacher Supply and Demand in Alberta, p. 71.

A third reason why response by students to the state of the labor market may be imperfect is the possibility that inherent interest in a particular field for some students may be more important than job opportunities or wages. The 1978 Statistics Canada survey revealed, for example, that philosophy graduates were among the most satisfied with both their jobs and their wages. Yet more than half of this group were underemployed, some had spent nearly 10 months looking for work and salaries were well below average for university graduates.[11] In all likelihood they were employed in areas unrelated to their specialization. Overall, evidence suggests that only a minority of students fits this philosophical mould. In the same 1978 survey, graduates who indicated that they regretted their choice of a field of study were in disciplines with generally high underemployment, unemployment and with lower salaries.[12] It appears that most graduates would prefer to select, in retrospect, programs related to labor market needs. Nevertheless, the fact that there are some who are unconcerned about labor market needs does tend to lessen the overall relationship between the two.

A final intervening factor which mitigates the relationship between student enrolments and the labor market has already been eluded to. Political, financial and institutional policy are additional influences on student opinion and choice. Historically, universities were relatively autonomous, elite institutions. Between 1951 and 1967 the federal government offered direct grants to universities on a per capita basis according to provincial population. The money was distributed directly to all members of the National Conference of Canadian Universities (now the Association of Universities and Colleges of Canada). During this time period, the provincial governments were nevertheless contributing the larger share to universities. Initially, a fairly select, small body of students attended and higher education was viewed as elite cultural consumption rather than economic investment. When social demand for places in university began to grow during the 1960s, there was a change from an elite to a mass institution. At the same time, human capital theorists speculated that a major source of economic growth was the improvement in the quality of human resources, in whom investment was yielding a positive rate of return. Following logically, the more of the masses who were educated, the greater the economic growth of the nation.

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[11] The Job Market Reality for Postsecondary Graduates, p. 183.

[12] Ibid., p. 153.

Under the terms of the Fiscal Arrangements Act in 1967, the federal government agreed to pay half of the then rapidly expanding operating costs for postsecondary institutions. "The big change was that payments were made to the provincial governments rather than directly to the institutions."[13] This was a big step in the erosion of autonomy for universities.

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[13] Association of Universities and Colleges of Canada, University Affairs, February, 1981, p. 4.

These two developments, more provincial control over financing and the change in the underlying rationale for higher education, gave provincial governments a larger presence in postsecondary education. Since university education was no longer considered elite cultural consumption but rather an economic investment in the masses, it was but a short step from human capital theory to manpower planning by the provincial government in Alberta.[14] Thus, when a changing economic climate in the 1970s cast some doubt on the "rate of return" from a liberal arts education, a change in emphasis to the manpower planning stance was adopted by government. If a university education was conceived as an investment, then the money should be directed towards those areas for which there was an acute labor market need.

The Alberta government gained an added wedge for imposing this vocational model on the universities. In 1977, amendments to the Fiscal Arrangements Act made "the three 'established programs' - postsecondary education, hospital insurance and medicine -... funded by annual block payments to each province."[15] The main problem with this arrangement is that the block payments are unconditional, the provinces are under no obligation to spend approximately one-third of the money, for example, on postsecondary education. It is likely that the money "designated" for universities is being spent elswhere. This seems apparent when total provincial operating grants to universities are compared to the EPF transfer payments "intended" for universities.[16] The budget restraints placed on universities in Alberta by the provincial government appear to have set up somewhat of a stalemate between the two. The government is encouraging the university to direct more funds to the professional and other occupationally-oriented faculties and away from the liberal arts areas. The university counters that it is essential to maintain a balance of programs. One result of this disagreement has been consistent financial allocations to universities falling one to two percent below inflation.[17]

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[14] Robert A. Runte, "The Emergence of the Open University Concept in Alberta," a thesis presented for the degree, Master of Education, 1981. Runte describes this change as the "vocationalization of university training."

[15] University Affairs, Feb., 1981, p. 5.

What are the ramifications of all these events on student choices? The effects are far-reaching. With budgets falling increasingly behind inflation, many additional university quota faculties have been added. Ironically, the quotas are most frequently imposed in those areas in greatest demand - both for student places and in the labor market. With so many qualified applicants turned away from faculties of their selection, it is impossible to determine the precise direction of student choice. The very knowledge that there are increasingly rigid entry restrictions to certain faculties may constitute a psychological barrier which deters some students from even submitting an application. The overall atmosphere is not one of encouragement to students in their pursuit of a university education. The prevailing attitude is no longer,

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[16] Ibid.

[17] Edmonton Journal, Oct. 29, 1981, p. B6. Quote from University of Alberta President, Dr. Myer Horowitz.

"Stay in School - Education Pays." Rather, "U. of A. too big, premier says"[18] more correctly describes the situation. If, as the headlines infer, the provincial government would prefer to restrict the growth of universities, what do they have in mind for the general populace as an alternative? A previously quoted document from Advanced Education and Manpower[19] suggests that the real growth in the 1980s will be in public colleges, technical institutes and apprenticeship areas, trade-oriented programs directly geared to the labor market. In support of this stance, the government earlier embarked on an advertising campaign to reinforce the worth of the "blue collar" worker. Again, this change in emphasis away from white collar promotion further confirms the world systems theory that economics can frequently dictate politics.

All of the foregoing events shaped the political, financial and institutional climate of universities in Alberta. Combined they constitute a powerful force. University students in the late 1970s faced funding cutbacks, tighter admissions policies and a much more negative climate of opinion than had been prevalent in the free-spending, white-collar promotional days of the 1960s. One is forced to entertain the question of whether or not the enrolment declines of the late 1970s, rather than constituting a lack of response to a buoyant Alberta labor market for university graduates, was instead a very direct response to a declining political and economic climate for universities in Alberta. When viewed from this perspective, it is perhaps fortunate that, under the circumstances, a reasonably stable graduate output from universities in Alberta over the 1975 to 1985 period is anticipated.

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[18] Ibid., Headline caption.

[19] Demographic and Manpower Trends in Alberta..., p. ii.

In summary, there are many variables which impinge on student choice in university. In spite of these, changing faculty choices among students did moderately relate to labor market needs in Alberta. Considering the many influences on student choice, even a moderate response is notable.

There is no doubt that students were entering a changed labor market in 1979 than that of a decade earlier. Again, these changes were largely international, economic alterations that affected all, not just university, labor market entrants. The qualification spiral and the spectre of underemployment loomed larger than before. Evidence suggests that, even in a booming economy like Alberta's, many graduates faced underemployment. Ivar Berg's[20] skepticism about the increase in educational credentials as prerequisites for employment appears to be a justifiable concern. It seems that the level of skill needed for modern employment is less than the educational requirements would suggest. The 1978 survey of university graduates found that 32.8 percent of bachelor's graduates and 10.9 percent of master's and Ph.D. graduates from the Alberta sample were underemployed.[21]

Relating to underemployment, this analysis also revealed that the labor force had a stable number of postsecondary, non-university graduates over a five year period while thousands of graduates from these institutes are annually entering the labor force. The only plausible explanation for their disappearance in labor force statistics is that many are joining the ranks of university graduates. This is occurring in spite of the fact that Alberta university graduates at all levels experience higher rates of underemployment than college graduates from three and four year programs.[22] In addition, increased levels of education in the labor force do not appear to improve worker performance since lowered levels of productivity have gone hand in hand with increased credentials. "Productivity today may be increasing more slowly than its historic rate of growth."[23] Thus, Berg's analysis is well supported by current research. The one thing that increasing levels of education does seem to bring, however, is a better income and perhaps that is one incentive leading to credentialism.

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[20] Education and Jobs: The Great Training Robbery.

[21] The Job Market Reality for Postsecondary Graduates, p. 96.

Average starting salaries for graduates was also a variable examined in this research. For the five occupations segregated, Alberta average incomes in industry gradually increased between 1970 and 1980 until they surpassed Canadian averages for the selected university graduates. Starting salaries for the graduates, relative to average industrial wages in Alberta, showed little change over the decade. Both increased at about the same rate. Those occupations segregated, however, were all highly paid careers consistently above the industrial composite wage. Because the sample is so small, generalizations cannot be made. However, there is little relationship between university enrolments and average starting salaries in industry for the five occupations. The largest salaries frequently correspond to the smallest enrolment-slowest growth fields. One possible reason for this is the fact that those fields in which job opportunities are the greatest are not necessarily the highest paid although they may be well above average. It appears that among occupations with higher than average starting salaries, job opportunity is the main attraction for students. Engineers may be paid smaller starting salaries in industry in Alberta than physical scientists but the probable demand for engineers is likely to be twenty times greater. Thus, there tends to be a much larger base enrolment in the latter field as well as increasing interest shown by students in the area. Perhaps students, like many others, assume that high demand will automatically bring better salaries. While this is frequently the case, there are some exceptions. At any rate, areas of specialization with the greatest shortages do not necessarily pay the highest starting wages in the labor market. Students, however, may be more concerned with wages ten years down the road.

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[22] Ibid., p. 116.

[23] Thurow, p. 327.

One of the propositions examined here was, as the number of job-seekers with bachelor's degrees increases, their starting salaries appear to deteriorate. That is, during the 1970s it is likely that starting salaries for bachelor's degree holders did not keep pace with the overall rise in wages. The conclusion reached in one study was:

> The pattern of an increasing starting salary relative to all workers from 1965 to 1968 and a decline thereafter holds FOR ALL DISCIPLINES (emphasis mine), although engineers' salaries were highest and three-year arts and science graduates' lowest.[24]

It was determined that by 1977 new bachelor's graduates earned only 88 percent of the average industrial wage.[25] No support was found for these statements. The five occupations isolated did not show consistent declines relative to average industrial wages between 1970 and 1980. A slight decline in relative starting salaries in one field was often balanced by an increase in the relative income in another field. Certainly, no decline IN ALL DISCIPLINES between 1970 and 1980 was evident. Furthermore, in an examination of the starting salary data from The Job Market Reality for Postsecondary Graduates, average salaries for bachelor's graduates sampled in 1978 were above the average industrial wage, not 88 percent of it. Average bachelor's salaries in 1978 in Canada were $14,800 and $15,200 in Alberta while average industrial wages were $13,799 and $14,369 respectively.[26]

There is some suggestion that starting salaries in some fields of specialization may be deteriorating relative to general wages but certainly not all fields or even the average. Anticipated recruiting rates of pay for general arts (not honors) graduates in Canada did deteriorate between 1975 and 1980 relative to average earnings in industry.[27] In many other areas, however, relative wages improved or remained the same. In terms of salaries, the general conclusion is that the 1970 decade in Alberta did not produce a progressively deteriorating market in which bachelor's wages consistently did not keep pace with the overall rise in wages. In this area, the comparative situation of the university graduate remained more favorable than anticipated.

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[24] Out of School - Into the Labor Force, p. 58.

[25] Ibid.

[26] Statistics Canada, Employment Earnings and Hours, Cat. No. 72-oos.

In conclusion, the main point to be emphasized from the analysis of the relationship of a university education to the labor market is that the plight of the university graduate is still better than the non-university labor force entrant. The foregoing analysis indicates that university graduates are still comparatively well off and Alberta graduates faced a better labor market than was evident on the national scene. Several generalizations which emphasize the comparative fortunes of Alberta university graduates as revealed in the foregoing analysis are:

1. The managerial-professional portion of the Alberta labor force grew faster than any other segment between 1975 and 1980 and faster than the rate of growth at the national level.
2. Job opportunities (demand) for university graduates in Alberta were much better than they were nationally.
3. Job opportunities (demand) for university-trained workers appeared to improve, not deteriorate, between 1975 and 1980 in Alberta although it is difficult to calculate the impact of

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[27] Pay Research Bureau, Anticipated Recruiting Rates for University and Community College Graduates, 1975-1980.

graduate imports.

4. University graduates consistently have the lowest rates of unemployment in the labor force.
5. Average starting salaries for university graduates are higher in Alberta than they are nationally (as are average industrial wages).
6. Average starting salaries for university graduates are higher than those of college graduates.
7. Average starting salaries of university graduates appear to have remained above average industrial wages (industrial composite) in both Canada and Alberta during the 1970 decade.
8. Higher levels of education, on the average, bring higher salaries.

While it is true that economic problems have reverberated through the economy of Canada during the 1970 decade, the university graduate still fares better in that troubled economy than other members of the labor force and Alberta graduates enter a more favorable milieu than graduates in other provinces.

APPENDIX A

General Education Development

APPENDIX A

General Education Development (GED)

The following is a table explaining the various levels of general educational development:

Level	Reasoning Development	Mathematical Development	Language Development
6	Apply principles of logical or scientific thinking to a wide range of intellectual and practical problems. Deal with non verbal symbolism (formulas, scientific equations, graphs, musical notes, etc.) in its most difficult phases. Deal with a variety of abstract and concrete variables. Apprehend the most abstruse classes of concepts.	Apply knowledge of advanced mathematical and statistical techniques such as differential and integral calculus, factor analysis, and probability determination, or work with a wide variety of theoretical mathematical concepts and make original applications of mathematical procedures, as in empirical and differential equations.	Comprehension and expression of a level to -Report, write, or edit articles for such publications as newspapers, magazines, and technical or scientific journals. Prepare and draw up deeds, leases, wills, mortgages, and contracts. -Prepare and deliver lectures on politics, economics, education, or science. -Interview, counsel, or advise such people as students, clients, or patients, in such matters as welfare eligibility, vocational rehabilitation, mental hygiene or marital relations. -Evaluate engineering technical data to design buildings and bridges.
5	Apply principles of logical or scientific thinking to define problems, collect data, establish facts, and draw valid conclusions. Interpret an extensive variety of technical instructions, in books, manuals, and mathematical or diagrammatic form. Deal with several abstract and concrete variables.		
4	Apply principles of rational systems to solve practical problems and deal with a variety of concrete variables in situations where only limited standardization exists. Examples of "principles of rational systems" are: Bookkeeping, internal combustion engines, electric wiring systems, house building, nursing, farm management, ship sailing. Interpret a variety of instructions furnished in written, oral, diagrammatic, or schedule form.	Perform ordinary arithmetic, algebraic, and geometric procedures in standard, practical applications.	Comprehension and expression of a level to -Transcribe dictation, make appointments for executives and handle their personal mail, interview and screen people wishing to speak to them, and write routine correspondence on own initiative. -Interview job applicants to determine work best suited for their abilities and experience, and contact employers to interest them in services of agency. -Interpret technical manuals as well as drawings and specifications, such as layouts, blueprints, and schematics.

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APPENDIX A

General Education Development (Cont'd.)

3 Apply common sense understanding to carry out instructions furnished in written, oral, or diagrammatic form. Deal with problems involving several concrete variables in or from standardized situations.	Make arithmetic calculations involving fractions, decimals and percentages.	Comprehension and expression of a level to -File, post, and mail such material as forms, cheques, receipts, and bills. -Copy data from one record to another, fill in report forms, and type all work from rough draft or corrected copy. -Interview members of household to obtain such information as age, occupation, and number of children, to be used as data for surveys, or economic studies. -Guide people on tours through historical or public buildings, describing such features as size, value, and points of interest.
2 Apply common sense understanding to carry out detailed but uninvolved written or oral instructions. Deal with problems involving a few concrete variables in or from standardized situations.	Use arithmetic to add, subtract, multiply, and divide whole numbers.	
1 Apply common sense understanding to carry out simple one- or two-step instructions. Deal with standardized situations with occasional or no variables in or from these situations encountered on the job.	Perform simple addition and subtraction, reading and copying of figures, or counting and recording.	Comprehension and expression of a level to -Learn job duties from oral instructions or demonstration. -Write identifying information, such as name and address of customer, weight, number, or type of product, on tags, or slips. -Request orally, or in writing, such supplies as linen, soap, or work materials.

Source: Employment and Immigration Canada, Canadian Classification and Dictionary of Occupations - Annual Guide, p. 53

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APPENDIX B

Specific Vocational Preparation

APPENDIX B

Specific Vocational Preparation (SVP)

Specific vocational preparation includes training given in any of the following forms:

a. University or College Training:

Training given by a degree granting institution and for which a degree, diploma, or certificate is issued. The average four-year university or college curriculum (except for liberal arts which is not vocationally oriented) is considered as equivalent to about two years of specific vocational preparation. Each year of university graduate schooling is regarded as one year of specific vocational preparation.

b. Vocational Training:

Training given by a vocational school or a non-degree granting college intended to develop general or specific skills, such as commercial, shop, or art training. In evaluating vocational training of this nature, thirty hours of such schooling is regarded as about fifteen hours of specific vocational preparation.

c. Apprenticeship:

Training given for an apprenticeable occupation.

d. In-Plant Training:

Training given or sponsored by employers either on or off their own premises, intended as preparation for a specific job in their plant.

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APPENDIX B

Specific Vocational Preparation (SVP) (Cont.d)

e. On-The-Job Training:

Any training acquired while serving as a learner or trainee on the job under instruction of a qualified worker, and intended as preparation for a specific job.

f. Experience in Other Jobs:

Experience acquired while serving in less responsible jobs, or serving in other jobs, which prepares a worker for a specific job at a higher grade.

ESTIMATING THE LEVEL OF SPECIFIC VOCATIONAL PREPARATION

The following is an explanation of the various levels of specific vocational preparation:

Level	Time
1	Short demonstration only.
2	Anything beyond short demonstration up to and including 30 days
3	Over 30 days up to and including 3 months
4	Over 3 months up to and including 6 months.
5	Over 6 months up to and including 1 year.
6	Over 1 year up to and including 2 years.
7	Over 2 years up to and including 4 years.
8	Over 4 years up to and including 10 years.
9	Over 10 years.

Source: Employment and Immigration Canada, Canadian Classification and Dictionary of Occupations - Annual Guilde, p. 54.

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APPENDIX C

C.C.D.O. CODES

(Canadian Classification and Dictionary of Occupations Codes)

C.C.D.O. CODES

(Canadian Classification and Dictionary of Occupations Codes)

The following table is a partial list of two, three and four digit C.C.D.O. occupation names which are excerpted from Canadian Classification and Dictionary of Occupations - Annual Guide 1978/79, published by Employment and Immigration Canada. Only those occupational groups which are generally included as "Managerial-Professional etc." by The Labor Force are listed. The selected occupations are given a more detailed (7-digit) breakdown in an earlier publication, Canadian Classification and Dictionary of Occupations 1971, Volumes 1 and 2.

MAJOR GROUP 11 — MANAGERIAL, ADMINISTRATIVE AND RELATED OCCUPATIONS

111 OFFICIALS AND ADMINISTRATORS UNIQUE TO GOVERNMENT

1111	Members of Legislative Bodies
1113	Government Administrators
1115	Postal Management Occupations
1116	Inspectors and Regulatory Officers, Government
1119	Officials and Administrators Unique to Government, n.e.c.

113/114 OTHER MANAGERS AND ADMINISTRATORS

1130	General Managers and Other Senior Officials
1131	Management Occupations: Natural Sciences, Engineering and Mathematics
1132	Management Occupations, Social Sciences and Related Fields
1133	Administrators in Teaching and Related Fields
1134	Administrators in Medicine and Health
1135	Financial Management Occupations
1136	Personnel and Industrial Relations Management Occupations
1137	Sales and Advertising Management Occupations
1141	Purchasing Management Occupations
1142	Services Management Occupations
1143	Production Management Occupations
1145	Management Occupations, Construction Operations
1147	Management Occupations, Transport and Communications Operations
1149	Other Managers and Administrators, n.e.c.

117 OCCUPATIONS RELATED TO MANAGEMENT AND ADMINISTRATION

1171	Accountants, Auditors and Other Financial Officers
1173	Organization and Methods Analysts
1174	Personnel and Related Officers
1175	Purchasing Officers and Buyers, Except Wholesale and Retail Trade
1176	Inspectors and Regulatory Officers, Non-Government
1179	Occupations Related to Management and Administration, n.e.c.

MAJOR GROUP 21 – OCCUPATIONS IN NATURAL SCIENCES, ENGINEERING AND MATHEMATICS

211 OCCUPATIONS IN PHYSICAL SCIENCES

2111	Chemists
2112	Geologists and Related Occupations
2113	Physicists
2114	Meteorologists
2117	Physical Sciences Technologists and Technicians
2119	Occupations in Physical Sciences, n.e.c.

213 OCCUPATIONS IN LIFE SCIENCES

2131	Agriculturists and Related Scientists
2133	Biologists and Related Scientists
2135	Life Sciences Technologists and Technicians
2139	Occupations in Life Sciences, n.e.c.

214/215 ARCHITECTS AND ENGINEERS

2141	Architects
2142	Chemical Engineers
2143	Civil Engineers
2144	Electrical Engineers
2145	Industrial Engineers
2147	Mechanical Engineers
2151	Metallurgical Engineers
2153	Mining Engineers
2154	Petroleum Engineers
2155	Aerospace Engineers
2157	Nuclear Engineers
2159	Architects and Engineers, n.e.c.

216 OTHER OCCUPATIONS IN ARCHITECTURE AND ENGINEERING

2160 Supervisors, Other Occupations in Architecture and Engineering

2161 Surveyors

2163 Draughting Occupations

2165 Architectural and Engineering Technologists and Technicians

2169 Other Occupations in Architecture and Engineering, n.e.c.

218 OCCUPATIONS IN MATHEMATICS, STATISTICS, SYSTEMS ANALYSIS AND RELATED FIELDS

2181 Mathematicians, Statisticians and Actuaries

2183 Systems Analysts, Computer Programmers and Related Occupations

2189 Occupations in Mathematics, Statistics, Systems Analysis and Related Fields, n.e.c.

MAJOR GROUP 23 – OCCUPATIONS IN SOCIAL SCIENCES AND RELATED FIELDS

231 OCCUPATIONS IN SOCIAL SCIENCES

2311 Economists

2313 Sociologists, Anthropologists and Related Social Scientists

2315 Psychologists

2319 Occupations in Social Sciences, n.e.c.

233 OCCUPATIONS IN SOCIAL WORK AND RELATED FIELDS

2331 Social Workers

2333 Occupations in Welfare and Community Services

2339 Occupations in Social Work and Related Fields, n.e.c.

234 OCCUPATIONS IN LAW AND JURISPRUDENCE

2341 Judges and Magistrates
2343 Lawyers and Notaries
2349 Occupations in Law and Jurisprudence, n.e.c.

235 OCCUPATIONS IN LIBRARY, MUSEUM AND ARCHIVAL SCIENCES

2350 Supervisors: Occupations in Library, Museum and Archival Sciences
2351 Librarians and Archivists
2353 Technicians in Library, Museum and Archival Sciences
2359 Occupations in Library, Museum and Archival Sciences, n.e.c.

239 OTHER OCCUPATIONS IN SOCIAL SCIENCES AND RELATED FIELDS

2391 Educational and Vocational Counsellors
2399 Other Occupations in Social Sciences and Related Fields, n.e.c.

MAJOR GROUP 25 – OCCUPATIONS IN RELIGION

251 OCCUPATIONS IN RELIGION

2511 Ministers of Religion
2519 Occupations in Religion, n.e.c.

MAJOR GROUP 27 – TEACHING AND RELATED OCCUPATIONS

271 UNIVERSITY TEACHING AND RELATED OCCUPATIONS

2711 University Teachers
2719 University Teaching and Related Occupations, n.e.c.

273 ELEMENTARY AND SECONDARY SCHOOL TEACHING AND RELATED OCCUPATIONS

2731	Elementary and Kindergarten Teachers
2733	Secondary School Teachers
2739	Elementary and Secondary School Teaching and Related Occupations, n.e.c.

279 OTHER TEACHING AND RELATED OCCUPATIONS

2791	Community College and Vocational School Teachers
2792	Fine Arts Teachers
2793	Post—Secondary School Teachers, n.e.c.
2795	Teachers of Exceptional Students, n.e.c.
2797	Instructors and Training Officers, n.e.c.
2799	Other Teaching and Related Occupations, n.e.c.

MAJOR GROUP 31 — OCCUPATIONS IN MEDICINE AND HEALTH

311 HEALTH DIAGNOSING AND TREATING OCCUPATIONS

3111	Physicians and Surgeons
3113	Dentists
3115	Veterinarians
3117	Osteopaths and Chiropractors
3119	Health Diagnosing and Treating Occupations, n.e.c.

313 NURSING, THERAPY AND RELATED ASSISTING OCCUPATIONS

3130	Supervisors, Nursing Occupations
3131	Nurses, Graduate, Except Supervisors
3133	Nurses—in—Training
3134	Nursing Assistants
3135	Nursing Attendants
3137	Physiotherapists, Occupational and Other Therapists
3139	Nursing, Therapy and Related Assisting Occupations, n.e.c.

315 OTHER OCCUPATIONS IN MEDICINE AND HEALTH

3151	Pharmacists
3152	Dieticians and Nutritionists
3153	Optometrists
3154	Dispensing Opticians
3155	Radiological Technologists and Technicians
3156	Medical Laboratory Technologists and Technicians
3157	Dental Hygienists, Assistants and Technicians
3159	Other Occupations in Medicine and Health, n.e.c.

MAJOR GROUP 33 – ARTISTIC, LITERARY, PERFORMING ARTS AND RELATED OCCUPATIONS

331 OCCUPATIONS IN FINE AND COMMERCIAL ART, PHOTOGRAPHY AND RELATED FIELDS

3311	Painters, Sculptors and Related Artists
3313	Product and Interior Designers
3314	Advertising and Illustrating Artists
3315	Photographers and Camera Operators
3319	Occupations in Fine and Commercial Art, Photography and Related Fields, n.e.c.

333 OCCUPATIONS IN PERFORMING AND AUDIOVISUAL ARTS

3330	Producers and Directors, Performing and Audiovisual Arts
3332	Musicians
3333	Choreographers and Dancers
3335	Acting Occupations
3337	Radio and Television Announcers
3339	Occupations in Performing and Audiovisual Arts, n.e.c.

335 OCCUPATIONS IN WRITING

- 3351 Writers and Editors, Publication
- 3353 Writers and Editors: Radio, Television, Theatre and Motion Pictures
- 3355 Translators and Interpreters
- 3359 Occupations in Writing, n.e.c.

MAJOR GROUP 37 - OCCUPATIONS IN SPORT AND RECREATION

371 OCCUPATIONS IN SPORT AND RECREATION

- 3710 Coaches, Trainers, Instructors and Managers, Sport and Recreation
- 3711 Referees and Related Officials
- 3713 Athletes
- 3715 Attendants, Sport and Recreation
- 3719 Occupations in Sport and Recreation, n.e.d.

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